ST. CLOUD STATE
UNIVERSITY™

SAFETY & ENVIRONMENTAL HEALTH COMPLIANCE PROGRAMS

CHEMICAL HYGIENE PROGRAM

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COSE Chemical Hygiene Plan

INTRODUCTORY STATEMENT

Through the Laboratory Standard, Title 29, Code of Federal Regulations, Part 1910.1450, the Occupational Safety and Health Administration (OSHA) requires a written Chemical Hygiene Plan (hereon referred to as CHP) and laboratory training to accompany this plan. This Laboratory Standard is "performance oriented"; it consists of guidelines that each laboratory unit can use to develop more specific guidelines and standard operating procedures (SOPs) for its own safe operation.

The purposes of the Chemistry CHP are:

- To define work practices and procedures to help ensure the protection of SCSU laboratory employees (faculty, staff and student employees) from any health and/or physical hazards associated with exposure to hazardous chemicals.
- To meet OSHA requirements regarding employee exposure limits.
- To fulfill all employee training needs as required by OSHA.
- To establish guidelines for use of any hazardous but unregulated chemicals.

The complete CHP consists of two parts:

- The general document containing departmental policies and safety practices in the section that follows; and
- The appendices, containing additional information and laboratory forms.

This Chemical Hygiene Plan (CHP) will achieve St. Cloud State University compliance with the Occupational Safety and Health Administration (OSHA) standard 29 CFR 1910.1450 that requires all employers engaged in the laboratory use of chemicals to comply with specific requirements, including the development and implementation of a Laboratory Chemical Hygiene Plan.

This plan contains sections that identify requirements for Hazardous waste stream source identification and characterization, signage, handling, labeling and hazardous waste disposal procedures consistent with Minnesota Pollution Control Agency (MPCA) rules chapters 7001, 7045, and 7046.

This plan is a fluid document subject to regulatory changes. Written recommendations to improve this plan may be submitted to the office of Safety and Environmental Health or to a member of the COSE Safety Committee. Submissions may be adopted following review by the Chemical Hygiene Officer, Joe Teff, and the COSE Safety Committee.

The responsibility for implementing and maintaining regulatory compliance with this CHP begins with the President and reaches through the entire university to include each Vice President, administrator, faculty member, staff member and student. University Operations, Office of Environmental Health & Safety is responsible for the administration of this plan.

Definitions:

As defined by OSHA:

- Laboratory Employee - Paid employee (SCSU faculty, staff and student employee) who works in a laboratory, and who may be exposed to hazardous chemicals in the course of his or her duties. **Students in laboratory classes are not covered by the Laboratory Standard, but the same care should be taken to protect them**.
- Laboratory - A workplace where relatively small quantities of hazardous chemicals are used for non-production purposes.
- Hazardous Chemical - A chemical for which there is significant evidence that exposure to that chemical can cause acute or chronic health effects.
- Research Advisor - A faculty member conducting research with a student enrolled in at least one credit.
- Lab Coordinator - Any faculty member responsible for students setting up and taking down laboratory experiments.

College of Science and Engineering:

- Biology
- Chemistry and Biochemistry
- Physics and Astronomy
- School of Computing, Engineering and Environment
  - Atmospheric and Hydrologic Sciences
  - Electrical and Computer Engineering
  - Environmental and Technological Studies
  - Mechanical and Manufacturing Engineering

The Laboratory's Chemical Hygiene Plan must be readily available to employees ensure that employees know where/how to access the plan. Ensure that the plan is capable of protecting lab users from health hazards and minimizing exposure. Include the following topics in the CHP:

(a) Individual chemical hygiene responsibilities
(b) Standard operating procedures
(c) Personal protective equipment, engineering controls and apparel
(d) Laboratory equipment
(e) Safety equipment
(f) Chemical management
(g) Housekeeping
(h) Emergency procedures for accidents and spills
(i) Chemical waste
(j) Training
(k) Safety rules and regulations
(l) Laboratory design and ventilation
(m) Exposure monitoring
(n) Compressed gas safety
(o) Medical consultation and examination

***It should be noted that the nature of laboratory work may also necessitate addressing biological/chemical safety, radiation safety, and laser and security issues.

Table of Contents

I. Basic Rules and Procedures

A. General Laboratory Rules

1. Date all chemicals
   Label all containers with "Date Received/Date Opened" label when receiving chemicals. Record the dates as specified.

2. Accidents
   All accidents requiring first aid or medical attention shall be reported to Public Safety immediately. All inquiries must be reported to the Workers Compensation Coordinator to prepare the required "First Report of Injury Form."

3. Spills
   Each laboratory supervisor (Appendix I) is responsible for the containment and cleanup of relatively small spills (one gallon or less) of chemicals or substances. The use of a spill kit or applying the appropriate absorbent or neutralizer is required. Place the residue into a container and contact the Chemical Hygiene Officer, Joe Teff, or the Safety and Environmental Health department to prepare a chemical incident report and arrange for pickup of the residue. Call the Safety and Environmental Health department when the spill is larger than one gallon or exceeds your comfort level.

   Large Spills of hazardous chemicals or substances that are harmful to employees and students as determined by the laboratory supervisor (Appendix I) may result in evacuation of laboratory or work area. Immediately report this situation to the Chemical Hygiene Officer as listed in the contingency plan.

4. Acids and Bases (corrosives)
   Corrosive chemicals will irritate or burn the skin, eyes, and respiratory tract. Severe exposure can cause permanent damage.

   Proper handling, use and storage procedures include:
   a. Add acid to water, never water to acid.
   b. Always pour corrosives slowly to avoid splashing or superheating. If necessary, decant the liquid with a glass rod.
   c. Always have an emergency source of water for washing in the work area in case of an accident.
   d. Flush the outside of corrosive containers after use.
   e. Double rinse the inside of empty corrosive containers after use.
   f. Wipe the work top area after using corrosives to rid the area of spatters and spills that may not be otherwise visible.
   g. <u>All basic solutions</u> are <u>stored in plastic containers</u>, if not in the original manufacturer's shipping container.
   h. All <u>acids</u> are <u>stored in glass containers</u>, if not in the original manufacturer's shipping container.
   i. Store acids and bases separately and away from flames.

5. Reactive Chemicals
   Reactive chemicals are unstable substances that can react violently with other chemicals or water to produce heat and dangerous gases. Reactive chemicals may ignite when exposed to air or water. Oxidizers may provide extra oxygen in a fire.
   a. Do not mix chemicals unless compatible. If in doubt, keep separate.
   b. Wipe the work top area after using reactive chemicals to rid the area of spatters and spills that may not be otherwise visible.

6. Solvents
   Solvents may pose a hazard to human health by defatting the skin causing chemical dermatitis or by acting on the brain, liver, or kidneys.
   a. Many solvents can be absorbed through the skin. Skin contact should be avoided.
   b. Many solvents have anesthetic or narcotic properties if inhaled, so use should be restricted to well-ventilated areas.
   c. Store Solvents in flame-resistant containers and storage cabinets.

7. Pesticides/Herbicides
   Pesticides/herbicides may pose a hazard to human health by interfering with nerve impulse transmission or by blocking metabolic pathways.
   a. Pesticides/herbicides may be absorbed through the skin, so skin contact should be avoided.
   b. Pesticides/herbicides may also be inhaled if they are in a powdered form or sprayed as an aerosol or mist. Use a respirator as required.

B. Planning

• Plan work in advance. Try to anticipate potential problems before they occur, and plan the appropriate actions to be taken in these situations.

• Know the location of emergency exits, fire alarms and extinguishers, eye wash stations, emergency showers, spill kits, etc. See appendix 1 for more information.

• Learn how to operate all available emergency equipment. See Chapter 4 for guidelines on use of emergency equipment.

• Whenever a question arises as to how to proceed with a reaction, manipulation or operation, or how to safely handle a particular chemical, ask the appropriate individual (lab coordinator and/or research advisor) for assistance. Additional information may be obtained from the safety committee or CHO.

• Before beginning work, remove unnecessary chemicals from teaching laboratories and/or immediate work area of research laboratories.

• Clean up promptly when finished.

• Inspect apparatus before use to ensure proper working condition.

• Dispose of or fix broken, cracked or chipped glassware.

• Dispose of broken glassware in containers designated for this purpose.

• For operations involving chemical vacuum systems:

    • Dewar flasks should be taped.

    • Glassware should be inspected for flaws

    • Vacuum systems should be used in fume hoods or behind shields where possible.

    • Goggles and/or face shields should be used with vacuum racks.

• In teaching laboratories, set out only the amount of chemicals necessary to complete the experiment.

• In research laboratories, only the amount of chemicals necessary to perform the experiment should be obtained from the stockroom. Unless you are planning to use them in the near future, excess chemicals should be returned when the experiment is completed.

• Do not transfer unused chemicals back into "stock" containers. Transfer them into clean, properly labeled containers for future use, or dispose of them properly. See the Labeling section (section 2.7) and the Chemical Waste Management section (Chapter 6) of this CHP for more information.

• Chemicals obtained from the stockroom should be in properly labeled containers.

• Promptly replace caps on opened containers of chemicals.

• Experiments which release hazardous or noxious vapors should be conducted in a fume hood.

C. General Laboratory Procedures

1. Eating, smoking and storage of food or beverages in laboratory defined space is prohibited or any area with chemical usage.

2. Personal protective equipment including eye protection shall be available and used in the laboratory as required.

3. The use of protective gloves shall be utilized whenever necessary to prevent skin contact with chemicals. Selection of the protective equipment shall be in accordance with the chemical manufacturer’s recommendations with approval from the Chemical Hygiene Officer, Joe Teff.

   Prior to each use, gloves shall be inspected by the user. Evidence of damage or deterioration which may compromise the glove shall be brought to the attention of the laboratory instructor/supervisor for replacement.

*Note: Material Safety Data Sheets (MSDS) or Safety Data Sheets (SDS) which are in the work area where chemicals and other substances are used, shall be available and used for reference purposes to insure that personal protective equipment and other precautions are followed.

4. Avoid use of contact lenses in the laboratory unless necessary. If they are used, the supervisor is to be informed so special precautions can be taken. (29 CFR 1910.1450 Appendix A (E) (1) (e)).

5. When the use of respirators may be required in the laboratory, they will be subject for use in a manner that is consistent with the St. Cloud State University Respiratory Protection Program defined by OSHA 1910.134. Contact the Respiratory Safety Administrator.

6. Personal Housekeeping is the responsibility of the individual. Each person is responsible for their immediate work area, including keeping drawers closed, keeping isles free of obstructions and ensuring the floor is clean and dry. Any unlabeled materials or chemicals should be brought to the attention of the laboratory supervisor who shall ensure the substance is properly labeled as required by MPCA/OSHA standards.

7. Horseplay in the laboratory is prohibited.

8. Mouth pipetting in the laboratory is prohibited.

9. Hair or clothing which may have contact with chemicals, flame, or moving equipment shall be restrained in a manner as to eliminate any potential hazard or accident.

10. Exiting the laboratory shall be done in a safe, orderly manner. Prior to routine exiting, the work area should be cleared, cleaned and free of obstructions.

11. Use of chemicals shall be under the direction of the laboratory supervisor (Appendix I). Use only chemicals which are appropriate for the operation as described in the operations/experiment plan.

12. Operations involving toxic chemicals (Appendix II, Part C) should be performed inside a functioning ventilation hood that exhausts directly into outside air.

13. Equipment and Glassware should be maintained in good condition.
    a. Never use scratched or chipped glassware.
    b. Always lubricate glass tubing when inserting into rubber stoppers.
    c. Never force rubber stoppers off glass tubing, slice the stopper parallel to the axis of the glassware.
    d. Always use hand protection when inserting glass.
    e. Remove tape or plastic or screening from glassware.
    f. Never shake flasks by the neck.

14. Avoid routine exposure by:
    a. Working with chemicals at a safe distance, and by using the laboratory hoods.
    b. Avoid the creating of dust by chemicals by carefully handling solids and powders.
    c. Avoid skin contact with chemicals.
    d. Pour liquids slowly to avoid splashing.
    e. Keep lids on containers when not in use.

15. Prior approval is required before any new experiment can be conducted (involving a chemical new to campus.) from the department chair person. Refer to the Operations Approval procedures section of this plan for additional required information.

16. Unattended operations shall be carried out in accordance with provisions of the Operations' Approval Section of this plan.

17. Laboratory tours are prohibited unless supervised and guided by the faculty in charge of the laboratory to ensure that all safety precautions are explained and all tour members wear the required personal protective equipment during the tour.

18. SYRINGE USE AND SYRINGE/SHARPS DISPOSAL --Syringe Use General Information
    A. Whenever possible, chemical-transfer syringes should be capped or corked
    B. Syringes must only be re-capped through the use of the "one-hand" method. Set the cap on a flat surface and use one hand to slide the needle into the cap.
    C. Chemical-transfer syringes should be stored with the needle capped.
    D. The plunger of a syringe should never be forced, instead replace the faulty syringe.
    E. Cold liquids may expand in the barrel of a syringe, forcing the plunger out. To prevent this, gently hold onto the plunger.
    F. Syringe/Sharps Disposal
        - All sharps should be disposed of in a sharps container.
        - If sharps are contaminated with a toxic or hazardous chemical, they should be disposed of in the proper way. For advice on proper disposal procedures, ask a Laboratory Specialist.

D. Operations/Procedures Approval
Prior to the implementation of any new process or experiment(s) in a University Space, the person developing the procedure/experiment shall submit a written proposal to the Dean of Science, Chemical Hygiene Officer, Joe Teff, and the Chemical Hygiene Officer Safety Committee, Laser Safety Officer or Radiation Safety Officer for approval and it will contain the following information.

1. The name of the person developing the procedure.

2. The purpose of the procedure.

3. The name(s) of the chemical(s) to be used in the experiment.

4. The quantity of the chemicals to be used.

5. Any known or suspected reaction products from the experiment and the form of the reaction products, such as gases, liquids, or solids which will be generated in the process.

6. The estimated amount and method for dealing with the finished product.

7. The estimated amount and method of dealing with by-products of the reaction.

8. The procedures to follow in the event of a utilities failure including; the failure of the ventilation system, failure of the water system if water cooling is used, or the failure of other utilities such as compressed gasses required for the completion of the experiment.

9. Any personal safety equipment and safety precautions which are to be taken by persons working on the experiment.

10. The method by which persons working on the experiment will be informed of proper handling procedures and potential hazards to also include lasers used and radioactive materials.

11. The name and phone number of an individual to contact in the event of an emergency.

    The Dean of College of Science and Engineering, Chemical Hygiene Officer, Joe Teff, and the Chemical Hygiene Safety Committee, shall review the procedures and notify the requesting individual in writing of the acceptance or denial of the proposal.

    The laboratory procedure manual shall be updated to include the new laboratory procedure following approval of the plan by the Chemical Hygiene Officer, Joe Teff. The laboratory manual will be accessible to laboratory employee's at all normal working times.

E. Chemical Classifications and Use Guidelines

The following guidelines should be observed when working with the subsequent specific classes of chemicals.

CLASSIFICATION OF HAZARDOUS CHEMICALS

Health Hazard

Chemicals that are referred to as health hazards are substances for which there is statistically significant evidence, based on at least one study conducted in accordance with established scientific principles, that acute (short term) or chronic (long term or possibly delayed) health effects may occur in exposed individuals.

Health hazards include:

Toxicity – A substance is toxic because of its ability to damage or interfere with the metabolism of living tissue.

Parameters for judging the toxicity of a chemical include the following terms:

- Lethal Dose (LD_{50}) is the quantity of material that when ingested, injected or applied to the skin as a single dose will cause the death of 50% of the test animals.

- Permissible Exposure Limits (PELs) are OSHA-regulated values which define the legal air contaminant concentrations in the workplace. PELs are expressed in ppm (parts of vapor or gas per million parts of air by volume at room temperature and atmospheric pressure) or mg/m^3 (milligrams of particulate per cubic meter of air).

- Threshold Limit Values (TLVs) refer to airborne concentrations of substances and represent conditions under which it is believed that nearly all workers may be repeatedly exposed day after day without adverse health effects. TLVs can be further broken down into:

- Time Weighted Average (TLV-TWA) is the time-weighted average concentration for a normal 8 hour workday and a 40 hour work week.

- Short-Term Exposure Limit (TLV-STEL) is the concentration to which persons can be exposed for a period of up to 15 minutes continuously without suffering irritation, chronic or irreversibly tissue change or narcosis.

In general, the lower the LD_{50}, PEL, or TLV, the more hazardous the material.

Chemical list #23 is the University of Minnesota list of regulated chemicals, with their PELs and TLVs. The U of M list also includes notations of MREP (male reproductive toxin), FREP (female reproductive toxin) and DTOX (developmental toxin). Additionally, the following common lists, compiled from 33 State and Federal Regulatory Lists, are found in the Chemical List Section:

Chemical List	Chemical Group
1 & 12	Carcinogens
19	Extreme Acute Health Ratings
20	Extreme Chronic Health Ratings
21	Neurotoxins
1 & 22	Teratogens

• Acutely toxic - substances inflict their damage as a result of a single exposure or an exposure of a short duration. According to the Minnesota Pollution Control Agency (MPCA), the following values define an acutely toxic substance:

- Oral LD_{50} (rat) of less than 50 mg/kg

- Inhalation LC_{50} (rat) of less than 2 mg/L

- Dermal LD_{50} (rabbit) of less than 200 mg/kg

Some examples of acutely toxic substances are hydrofluoric acid, hydrogen cyanide, hydrogen sulfide and nitrogen dioxide.

- Chronically toxic - substances cause damage after repeated exposures or lower dose exposures of a longer duration. Also associated with some chronic toxins are long latency periods in which the cumulative effects of the substance are not evident for many years. Some examples of chronically toxic substances are all carcinogens and many metals and their derivatives (i.e. arsenic, cadmium, lead, mercury and nickel).

All new and untested chemicals should be treated as toxic until scientific evidence proves otherwise.

F. Irritants and Allergens/Sensitizers

Irritants are chemicals, which are not corrosive but cause reversible inflammatory effects on living tissues at the site of contact. Allergens/Sensitizers are substances, which may produce skin or lung hypersensitivity after repeated exposure. Some common examples of such substances are chromium metal and chromium-containing compounds, diazomethane, nickel metal and nickel- containing compounds, dichromates, formaldehyde, isocyanates and certain phenols. When working with irritants and allergens:

• Keep direct contact to a minimum.

• Consult and follow the recommendations contained in the appropriate MSDS/SDS for specific precautions.

•Wear appropriate gloves and/or a dust mask as recommended by the manufacturer.

G. Reproductive toxins, Carcinogens, Acute and Chronic Toxins

Carcinogens are substances that promote or initiate the development of malignant or benign growths in living tissue. Carcinogens can be listed as known carcinogens or suspected or potential carcinogens. Some examples of known carcinogens are asbestos, benzene, formaldehyde, inorganic arsenic, chromium and nickel compounds. A list of carcinogenic substances can be found at any of the following:

1) National Toxicology Program as "Known to be carcinogenic" or "reasonably anticipated to carcinogens" in the latest edition of the Annual Report on Carcinogens.

2) Occupational Safety and Health Administration (OSHA) regulated as such in 29 CFR 1910.1000, Subpart Z.

3) International Agency for Research on Cancer (IARC) as Group 2A or 2B in the latest edition of Monographs.

Reproductive toxins are substances which exhibit harmful effects in either the male or female reproductive system, or on a developing fetus. Reproductive toxins can be further subdivided into the following classes:

1) Embryotoxins - substances which are poisonous to an embryo without necessarily being poisonous to the mother.

2) Mutagens - substances which induce changes in DNA and in living cells.

3) Teratogens - substances which cause physical or functional defects in developing embryo. The direct results of teratogenic chemicals are compromised survivability or birth defects in the newborn.

Safety Guidelines for Reproductive toxins, Carcinogens, Acute and Chronic Toxins:

A minimum set of guidelines that should be followed when working with reproductive toxins, carcinogens, acutely toxic chemicals, chronic toxins, and experimental chemicals with unknown toxicity are listed below. The Lab Coordinator, Research Advisor and Research Student should ensure that these and other necessary precautions are taken when working with these substances.

• All work must be performed in a functioning fume hood, ventilated glove box, sealed system or other system designed to minimize exposure to these substances.

• Detection equipment may be required to ensure the fume hood is working properly in laboratories where chemicals with a high degree of acute toxicity are utilized.

• Gloves and other appropriate protective apparel must be worn when working with these chemicals. Check the chemical's MSDS/SDS for the appropriate personal protective equipment.

• The quantities used and stored in the laboratory and their concentrations in solution or mixtures should be minimized.

• Decontaminate and clean the work area at appropriate intervals.

• All contaminated wastes must be collected and disposed of in an appropriate manner as outlined in the SCSU CHP. For more specific disposal information contact the Laboratory Specialist.

• When not in use, these chemicals should be stored in a limited access area and within protective containment devices.

• Volatile substances should be stored per manufactures specifications.

• Compressed gas cylinders which contain acutely toxic chemicals must be kept in a ventilated gas cabinet.

• Anyone whose work involves regular and frequent handling of toxicologically significant quantities of a chemical should consult with CHO to arrange for a qualified physician to determine whether a regular schedule of medical surveillance is desirable.

• Employees should comply with the recommendations contained in the National Institutes of Health (NIH) publication entitled "NIH Guidelines for the Laboratory Use of Chemical Carcinogens".

H. Corrosive Chemicals

Corrosives are chemicals which visibly erode or irreversibly alter living tissue, and are particularly damaging to the eyes. Respiratory damage, by means of severe bronchial irritation, occurs from the inhalation of the vapors or mists of these types of chemicals. All of the hydrogen halides, alkali metal hydroxides, and aqueous solutions of ammonia are extremely destructive to both the skin and eye tissues. There are three general categories of corrosive chemicals:

- Strong acids, which generally include nitric, hydrochloric, sulfuric, and phosphoric.
- Strong bases, commonly potassium hydroxide, and sodium hydroxide.
- Dehydrating agents, such as concentrated sulfuric acid, sodium hydroxide, phosphorus pentoxide, and calcium oxide.

When working with corrosives:

- Store and use liquid corrosives below eye level.
- Use spill trays under the containers.
- Never add water to a concentrated acid. Always add acid to water.

- Refrain from rubbing eyes until fingers are thoroughly washed to avoid possible eye contact.
- Use volatile concentrated corrosive liquids only in a fume hood.
- Where practical try to store acids separately from bases and according to compatibility.
- Perchloric acid must be stored separately from organic materials and other acids.

Chemical Lists # 2 &13 list common corrosive chemicals.

I. Compressed Gases

When working with compressed gases:

- Upon ordering any compressed gas cylinder, make certain the cylinder can be returned to the supplier, or ensure arrangements for its disposal can be made.
- Securely fasten cylinders in an upright position and in such a manner that they cannot be tipped.
- Do not expose cylinders to temperatures higher than 50 °C (122 °F).
- Never lubricate, modify, force or tamper with cylinder valves. The specificity of a regulator fitting must be honored as determined by the Compressed Gas Association.
- Do not use Teflon tape with regulators where significant hazards exist.
- Use a soap solution to test connections for leaks upon installation.
- Check the MSDS/SDS or other sources for safety procedures for the gas being used.
- Maintain labels. The cylinder decal or label is the only positive way to identify the gas contained within a cylinder. Color codes are not uniform among the manufacturers.
- Do not use open flames where oxidant or flammable gases are stored.
- Cylinders without regulators should be capped and secured at all times.
- Store all gas cylinders, not in regular use, in the stockroom.
- Do not store gas cylinders containing toxic and hazardous chemicals in unventilated enclosures.

- Gas cylinders containing flammable chemicals stored inside buildings must be stored 20 feet or a noncombustible barrier of at least five feet high (with fire resistance rating of at least on half hour) from flammable gas containers or combustible materials.

To move a compressed gas cylinder:

1) Remove the regulator and replace the protective cap.

2) Use a hand truck. Properly secure the cylinder on the truck before beginning the move.

J. Toxic Compressed Gases

When working with extremely toxic gases, the following additional precautions are needed:

- Do not work with the gas unless you are fully familiar with its proper handling procedures and its toxic or corrosive effects.
- When not in use, store in a secured well-ventilated area.
- Before use, lecture bottles must be secured in a fume hood.
- Larger cylinders of extremely toxic gases which cannot fit inside a fume hood should have special provisions of local exhaust and warning systems.
- Post warning signs around the work area and on all doors of the laboratory when using an extremely toxic compressed gas.

K. Flammable Chemicals

Flammable chemicals are classified as having a flash point of less than 100°F (≈37°C). An understanding of the following terms is helpful when working with flammable chemicals.

- Flash point - the lowest temperature which the vapor above the liquid will ignite if an ignition source is present. For example, the flash point for ethyl ether is -49 °F.
- Ignition/Autoignition temperature - the minimum temperature required to initiate or cause self-sustained combustion which is independent of a spark or flame source.

- Flammability Limits - each flammable gas and liquid (in the form of a vapor) has two limits which define the range of concentrations in mixtures with air that will propagate flame and explode.
    - LEL (lower flammable limit / lower explosive limit) - the percent by volume concentration below which the mixture is too lean to burn.
    - UEL (upper flammable limit / upper explosive limit) - the percent by volume concentration above which the mixture is too rich to burn.
    - The flammable range (explosive range) consists of all the concentrations between the LEL and UEL.
- Spontaneous combustion or ignition - this phenomenon takes place when, without the application of an external heat source, a substance reaches its ignition temperature.

When working with flammable chemicals:

- Keep in covered containers when not in use.
- Keep all sources of ignition (spark, high heat) away from storage and dispensing areas.
- Keep all flammable solvents away from inadvertent contact with oxidizers.
- Dispense one liter or greater amounts of flammable solvents within a fume hood or explosion room, and into containers that meet the combustible liquid container size limits found in Appendix 13.
- Do not store flammable liquids on the floor.
- Use in the smallest amounts possible so that any spill can be cleaned up before it can cause a large fire.

Chemical lists # 3,4,17 & 18 list common flammable chemicals.

Static Electricity, Bonding and Grounding of chemicals in class 1A and amounts more than four liters:

Static electricity may be generated by the contact and separation of dissimilar materials. For example, static electricity is generated when:

1. A fluid flows from a container opening down a funnel
2. Through agitation and mixing
3. Through filling a container which causes splashing

In the case of flammable liquids, spark discharges from static electricity build-up may have enough energy to ignite the vapors present. In order to prevent these discharges, proper bonding and grounding procedures of the equipment involved must be carried out.

By definition, bonding is a procedure which eliminates static-electrical-charge differences between two or more objects. Grounding is a procedure which eliminates a potential difference between an object and the ground (earth).

When two objects are bonded, the charges flow freely between the objects and there is no difference in their charge. Bonding will not eliminate the static charge but will equalize the potential between the objects bonded so that a spark will not occur between them. Bonding will eliminate a difference in potential between objects that are bonded. However, it will not eliminate a difference in potential between these objects and the earth, unless one of the objects has an adequate conductive path to earth. An adequate ground, which will continuously discharge a charged conductive body, is necessary to complete the conductive path.

Bonding and grounding are only effective when the bonded objects are made of conductive materials. Plastics can accumulate significant static electrical charge without allowing the charge to disperse enough through the material. Therefore, non-approved plastic containers and funnels should not be used when transferring flammable liquids in quantities larger than four liters.

The equipment necessary to carry out bonding and grounding is available in the stockroom.

Bonding and Grounding Procedures for transferring flammable liquids in quantities greater than four liters:

Please note that only metal funnels and the appropriate containers, preferably safety cans, should be used. Please see Appendix 13 for flammable liquids container requirements. Whenever possible, perform the transfer in a fume hood or explosion room.

1. Goggles and lab coats should be worn.

2. Using a bonding/grounding wire, connect the original container to the funnel. Using another wire, connect the funnel to the receiving container. If the containers involved are metal and coated in some way (paint, plastic), scrape down to the metal with the clamp on the wire to ensure a good connection.

3. Using a bonding/grounding wire, connect the container to a ground source such as the water spigot in the hood or another conductive metal source.

L. Infectious Agents

Academic Use

Proper laboratory procedures to follow when working with infectious or potentially infectious agents are not within the scope of this CHP. Prudent practices to follow when working with these agents are contained in reference texts such as the Centers for Disease Control and National Institute of Health's "Biosafety in Microbiological and Biomedical Laboratories"--NIH No. 88-8395 and the National Research Council's "Biosafety in the Laboratory."

Additionally, the SCSU bloodborne pathogens written policy as required by 29 CFR 1910.1030 is available in Appendix 14**.** Under these policies laboratory work involving human blood or other potentially infectious materials must be reviewed by the Research Advisor and CHO before any work commences.

Potential Exposure Limits

All faculty, staff, student employees and students should take prudent steps to lessen the chance of exposure to human blood and other potentially infectious materials. Gloves must be worn whenever blood is used.

See Chapter 4 for more information on emergency response.

M. Explosives, Highly Reactive Chemicals and Oxidizers

Unstable or highly reactive chemicals are those which in the pure state or as commercially produced, will vigorously polymerize, decompose, condense or will become self-reactive under conditions of shock, pressure or temperature. Compounds containing the following functional groups tend to be sensitive to heat and shock: acetylide, diazo, nitroso, peroxide, azide, halamine, and ozonide.

Compounds containing nitro groups may be highly reactive, especially if other substituents such as halogens are present. Treat the following groups with care, especially at higher temperatures: perchlorates, nitrates, chlorites, chlorates, bromates, iodates.

Special handling procedures for explosives, highly reactive chemicals, and oxidizers:

- Consult guidelines in the appropriate references or MSDS/SDSs before using chemicals exhibiting these properties.
- Research advisors are responsible for informing their research students of the hazards associated with working with highly reactive chemicals.

- Student researchers are responsible to properly prepare for use of these chemicals prior to starting work.
- Bring these chemicals into the laboratory only as required and then in the smallest possible quantities.
- Do not mix even small quantities with other chemicals without prior knowledge of the hazards involved.
- Wear safety goggles, appropriate gloves, and perform work in a fume hood or use an explosion shield.
- Highly reactive chemicals should not be stored in the same room as flammable liquids. Please see the laboratory specialist for the designated storage location.

Lists of common highly reactive and explosive chemicals are included as Chemical List # 10, 11, 14, 15 & 16. Additionally, lists of common oxidizers and oxidizer chemical families are included as Chemical Lists # 6 & 7.

N. Physical Hazards

Physical hazards include the following classes:

Combustible Substances - are liquids with a flash point of more than 100°F or solids that are difficult to ignite and that burn relatively slowly. (See section 3.1.1 F for the definition of flash point.) Examples of combustible liquids include diesel oil and corn oil.

Compressed Gases - are either gases or mixtures of gases in containers having an absolute pressure exceeding 40 pounds per square inch (psi) at 70°F (21°C); or a mixture of gases, in a container with an absolute pressure above 104 psi at 130°F (54.5°C), regardless of the pressure at 70°F (21°C). Compressed gases also include flammable liquids having a vapor pressure greater than 40 psi at 100°F (37.8°C). Please see sections 3.1.1 D for more specific compressed gas use guidelines.

Explosives - are substances that cause a sudden, almost instantaneous release of energy, pressure, gas and heat when subjected to sudden shock, pressure or high temperature. Explosives are separated into classes that range from minimum hazard to severe. Some examples of severe explosives are benzoyl peroxide, dry picric acid and lead azide. Please see section 3.1.1 H for more specific explosive substance use guidelines.

Flammable Substances - are substances with a flash point of less than 100°F that readily catch fire and burn in air. A flammable liquid, itself, does not burn--it is the vapors given off from the liquid that ignite. Different liquids produce flammable vapors at different rates, with the rate dependent on the liquid's vapor pressure. Common

flammable liquids found in laboratories are ethanol, methanol, acetone, ether and toluene. Please see section 3.1.1 F for more specific flammable chemical use guidelines.

Oxidizers - are substances, other than blasting agents or explosives that initiate or promote combustion in other materials, causing fire either of itself or through the release of oxygen or other flammable gases. Common oxidizer chemical families include bromates, chlorates, chromates, iodates, nitrates, nitrites, perborates, percarbonates, perchlorates, periodates, permanganates, peroxides and persulfates. Please see section 3.1.1 H for more specific oxidizer use guidelines.

Pyrophoric Substances - are liquids or solids that will ignite spontaneously in air below 130°F (54.4°C). These materials must be stored in an atmosphere of inert gas or under kerosene. White phosphorus and titanium dichloride are pyrophoric.

Water-Reactive Substances - are substances that react with water to release a gas which is either flammable or a health hazard. Sodium metal and many of the metal hydrides are water-reactive.

O. Lone Worker Policy

• During regular business hours, employees may conduct hazardous experiments.

• Outside of regular business hours, faculty may perform hazardous experiments.

• Student researchers may conduct hazardous experiments outside of regular business hours provided there is another person present, and the student has the approval of their laboratory coordinator as indicated by the appropriate written permission.

• Student employees or student researchers performing non-hazardous lab work during normal working hours must clear the procedures with their laboratory coordinator and carry the work out with their laboratory coordinator's knowledge.

• Student employees or student researchers performing non-hazardous laboratory work outside of normal working hours must have the appropriate written permission from their laboratory coordinator.

II. Chemical Procurement Distribution and Storage Procedures

A. Purchasing Procedures

Persons requesting purchase of chemicals for use in the University space shall submit the requests as necessary via the automated purchasing system. If the chemical being purchased is new and has not been purchased before, then:

1. Submit a completed "New Chemical Purchase Form" to the Department Chair, Jeff Stobb, Chemistry & Biochemistry Department College Laboratory Services Specialist, or Brian Lorenz, Biology Department College Laboratory Services Specialist.

2. The request shall be accompanied by a Safety Data Sheet (SDS) obtained either from the manufacturer or distributor.

3. A copy of the Operations and Procedure protocol shall be submitted as detailed in section IV of this plan.

4. The Safety Data Sheet (SDS) shall be reviewed by the Chemical Hygiene Officer, Joe Teff, and/or Chemical Hygiene Committee and a determination made as to whether or not appropriate emergency and safety equipment, including HVAC, and procedures are in place prior to the purchase of the chemical.

5. The Chemical Hygiene Officer, Joe Teff, has delegated authority to stop any order in an emergency situation. Any complaint shall be heard by the Chemical Hygiene Committee.

6. Information on proper handling, storage, and disposal should be known to those who will be involved before a substance is received.

7. Only containers with adequate identifying labels should be accepted.

8. Ideally, a central location should be used for receiving all chemical shipments.

9. Shipments with breakage or leakage will be refused.

10. Only the minimum amount of the chemical needed to perform the planned work should be ordered.

11. Purchases of high risk chemicals shall be reviewed and approved by the CHO.

12. Proper protective equipment and handling and storage procedures should be in place before receiving a shipment.

B. Chemical Receiving Procedures

1. All persons receiving chemicals shall insure the container is properly labeled and in good condition. Any container not labeled in accordance with OSHA regulations will not be accepted and shall be returned to the manufacturer or distributor.

3. Shipments of leaking containers or broken chemical containers will be rejected by the receiving department and returned to the vendor/shipper.

C. Chemical Distribution Procedures

1. Chemicals will be received, handled and delivered by University employees who have received Right-to-know training from their supervisors.

2. Chemicals should be transported in a fashion to prevent possible damage to the container. Chemicals should be segregated in transport to minimize the possibility of mixing should an accident occur.

3. Chemicals will be distributed only to authorized individuals by the Receiving/Delivery Department. Prior authorization shall be determined by and obtained from Jeff Stobb, Chemistry & Biochemistry Department College Laboratory Services Specialist, or Brian Lorenz, Biology Department College Laboratory Services Specialist.

4. As described above, a risk assessment should be conducted prior to beginning work with any hazardous chemical for the first time.

5. All SDS and label information should be read before using a chemical for the first time.
6. Trained laboratory users should ensure that proper engineering controls (ventilation) and PPE are in place.

7. Prudent management of chemicals in any laboratory is greatly facilitated by keeping an accurate inventory of the chemicals stored.

8. Unneeded items should be appropriately discarded or returned to the storeroom.

9. Secondary containment devices should be used when transporting chemicals.

10. When transporting chemicals outside of the laboratory or between stockrooms and laboratories, the transport container should be break-resistant.

11. High-traffic areas should be avoided.

12. Use adequate ventilation (such as a fume hood) when transferring even a small amount of a particularly hazardous substance (PHS).

13. While drum storage is not appropriate for laboratories, chemical stockrooms may purchase drum quantities of solvents used in high volumes. Ground and bond the drum and receiving vessel when transferring flammable liquids from a drum to prevent static charge buildup. Drums should be placed on a spill pallet that is designed to contain 10% of the total volume of the chemicals or 100% of the largest container whichever is greater and not directly on the floor.

14. If chemicals from commercial sources are repackaged into transfer vessels, the new containers shall be labeled with all essential information on the original container.

D. Chemical Storage Procedures

1. Chemicals should be stored in secured areas not accessible to unauthorized employees or the general public.

2. Chemical storage areas shall be labeled “Chemical Storage Area.”

3. Only authorized individuals shall be allowed in the chemical storage area. Authorization shall be determined by the Chemistry/Biology stockroom staff.

4. If the chemical storage area contains any chemicals which are injurious or corrosive materials, there shall be an emergency shower and eye wash within 25 feet of the storage or distribution point. Passage to the shower and eye wash shall be an unobstructed travel path.

5. Chemicals should be segregated in storage to prevent the mixing of incompatible chemicals should an accident or container rupture occur.

6. Storage of compressed gas cylinders shall be in accordance with OSHA, St. Cloud Fire Code, and compressed gas storage rules as published.

7. Chemical storage areas and methods shall comply with applicable provisions of the St. Cloud Building Codes, St. Cloud Fire Codes, and OSHA and MPCA standards.

8. Certain chemicals, such as Picric Acid, ether and some organic peroxides become shock sensitive with age. There should be a routine chemical inventory made of storage rooms(s) to determine the age and condition of these types of chemicals. Any chemical of this type found to be dehydrated or crystallized shall not be handled, moved or disposed of except by trained members of the St. Cloud bomb squad.

9. SDS and label information should be followed for storage requirements.

10. Maintain existing labels on incoming containers of chemicals and other materials.

11. Labels on containers used for storing hazardous chemicals must include the chemical identification and appropriate hazard warnings.

12. The contents of all other chemical containers and transfer vessels, including, but not limited to, beakers, flasks, reaction vessels, and process equipment, should be properly identified.

13. Chemical shipments shall be dated upon receipt and stock rotated.

14. Peroxide formers shall be dated upon receipt, again dated upon opening, and stored away from heat and light with tightfitting, nonmetal lids. Once open they will be periodically tested with peroxide test strips.

15. Open shelves used for chemical storage should be secured to the wall and contain 3/4-inch lips. Secondary containment devices should be used as necessary.

16. Consult the SDS and keep incompatibles separate during transport, storage, use, and disposal.

17. Oxidizers, reducing agents, and fuels should be stored separately to prevent contact in the event of an accident.

18. Chemicals should not be stored in the chemical hood, on the floor, in areas of egress, on the benchtop, or in areas near heat or in direct sunlight.

19. Laboratory-grade, flammable-rated refrigerators and freezers should be used to store sealed chemical containers of flammable liquids that require cool storage. These refrigerators and freezers shall be labeled "Do not store food or beverages".

20. Highly hazardous chemicals should be stored in a well-ventilated and secure area designated for that purpose.
21. Flammable chemicals should be stored in a spark-free environment and in approved flammable-liquid containers and storage cabinets. Grounding and bonding should be used to prevent static charge buildups when dispensing solvents.

22. Chemical storage and handling rooms shall be controlled-access areas. They should have proper ventilation, appropriate signage, diked floors, and fire suppression systems.

III. Environmental Monitoring

A. Environmental Monitoring - General

Regular instrumental monitoring of contaminants in the laboratory is not usually justified or practical when existing fume hoods and HVAC systems are operating correctly.

Monitoring may be necessary when installing new equipment such as laboratory hoods or when a new experiment not utilizing a hood is to be conducted.

The necessity of monitoring should be reviewed with the Chemical Hygiene Officer, Joe Teff, prior to the initiation of monitoring for selection of the instrumentation and selection of the analytical techniques.

Routine monitoring shall be conducted as required under 29 CFR 1910.

B. Application of Chemical Exposure Standards

Monitoring standards shall be consistent with OSHA Permissible Exposure Levels (PELs) as documented in 29 CFR 1910.1000.

In the absence of an established PEL, the Chemical Hygiene Officer, Joe Teff, or Director of Environmental Health & Safety will consult with a certified industrial hygienist to determine the appropriate Threshold Limit Valve (TLV) or other standard that is most appropriate.

C. Initial Monitoring

Initial monitoring may be conducted when new equipment, processes or chemicals are introduced into the workplace.

D. Periodic Monitoring

Periodic monitoring shall be conducted as deemed appropriate by the Chemical Hygiene Officer, Joe Teff, Chemical hygiene Committee, safety administrator, or as required by standards.

E. Termination of Monitoring

Termination of monitoring shall occur when safe levels of suspected contaminants have been verified by appropriate sampling/testing methods.

F. Employee Notification of Monitoring Results

Employees will be notified of monitoring results within 15 days of the receipt of the monitoring results in writing either individually, or by posting the results in a place accessible to the employee.

IV. Inspection Program

Maintenance and regular inspection of laboratory equipment are essential parts of the laboratory safety program. Management should participate in the design of a laboratory inspection program to ensure that the facility is safe and healthy, workers are adequately trained, and proper procedures are being followed. The program should include an appropriate combination of routine inspections, self-audits, program audits, peer inspections, EHS inspections, and inspections by external entities.

A. General Housekeeping Procedures

Floors and table tops shall be cleaned on a regular basis. General cleaning procedures shall be reviewed with the Chemical Hygiene Officer, Joe Teff, and the Chemical Hygiene Safety Committee to determine if the chemicals used in the laboratory cleaning are compatible with the laboratory environment so as to not create an additional hazard. All Classroom/lab areas will be cleaned and organized following the last days of exams or classes by the responsible person, staff or faculty for the space. This is defined as the end of spring term, end of summer term and the end of fall term.

Chemical spills cleanup shall be coordinated by an individual familiar with the chemical and appropriate cleanup procedures.

1. Inspectors should bring a checklist to ensure that all issues are covered and a camera to document issues that require correction.
2. Conversations with workers should occur during the inspection, as they can provide valuable information and allow inspectors an opportunity to show workers how to fix problems.
3. Issues resolved during the inspection should be noted.
4. An inspection report containing all findings and recommendations should be prepared for management and other appropriate workers.
5. Department Chairpersons should follow-up on the inspection to ensure that all corrections are
   Implemented.

B. General Maintenance Procedures

Persons performing general maintenance in the laboratory shall be advised by the laboratory supervisor or the Chemical Hygiene Officer, Joe Teff, of the hazards to which they may be exposed prior to the beginning of the maintenance activity. If the maintenance activity may result in the exposure to harmful substances, infectious agents or harmful physical agents, the maintenance personnel shall be fitted with the appropriate personal protective equipment prior to commencing the maintenance work.

Work on electrical equipment shall be conducted in accordance with the energized equipment work standard and all sources of energy shall be locked and tagged out prior to beginning work (29 CFR 1910.147).

C. Safety Audits/Inspections

General laboratory safety audits shall be conducted by the Safety and Environmental Health Office and/or Laboratory Supervisor on an annual basis. Results of the inspection shall be maintained in each laboratory, each department chairperson and the Safety and Environmental Health Office. Records of Respiratory Safety Program and the testing of shower and eye wash stations shall be kept by the Plumber/Fitter Supervisor and the Safety and Environmental Health Office.

Eye wash fountains shall be inspected at intervals of not less than one month. In the case of fixed pipe eye wash installations, this inspection shall include a water flow check. In the case of portable, non-piped installations, this inspection shall include a water volume check. Biocides shall be added to the water, and water changed as per the manufacturer's instructions.

Eye washes shall be capable of providing a minimum flow of 0.4 gallons per minute for a washing time of 15 minutes and must allow the user to have both hands free for washing the eyes. Bottle type eye washes are not permitted.

The path to the emergency eye wash/shower shall not be longer than 25 feet and must be free and clear of obstructions when highly corrosive agents are used, and be up to 100 feet for other chemical agents.

Safety showers shall be inspected and tested at least every three months.

Respirators shall be inspected and maintained in accordance with 29 CFR 1910.134, the respiratory protection standard.

Other required safety equipment shall be inspected and tested in accordance with the applicable standard.

V. Medical Program

A. Pre-Placement Screening

Pre-placement screenings shall be provided by St. Cloud State University or designees whenever required by statute. The content of the medical examination(s) shall be consistent with Minnesota statutes, MPCA rules and OSHA Standards.

B. Medical Consultation and Medical Examinations

Whenever an employee develops signs or symptoms associated with a hazardous chemical, infectious agent, or hazardous physical agent in the laboratory, they shall be offered the opportunity to receive medical attention. This shall be done as soon as possible, depending upon the circumstances of the exposure.

A First Report of Injury shall be filled out and filed with the Workers' Compensation Coordinator in the Human Resources Office.

Where exposure monitoring has revealed an exposure level routinely above the "action level" or PEL in the absence of an action level for an OSHA regulated substance for which there are exposure monitoring and medical surveillance requirements, medical surveillance shall be established for the affected employee(s) as prescribed by the particular standard.

All medical examinations and consultations in a follow-up to an exposure shall be performed by or under the direct supervision of a licensed physician and shall be provided without cost to the employee, without loss of pay and at a reasonable time and place.

C. Information to be provided to Physicians

Information provided to physicians by the Human Resources Office shall include.

1. The identity of the hazardous chemicals, infectious agents or hazardous physical agents to which the employee may be routinely exposed, or in the case of accidents, the identity of the hazardous materials to which the employee may have been exposed.

2. A description of the exposure conditions including quantitative data whenever available.

3. Pertinent toxicologal data for the hazardous materials. This information release can be coordinated through the Hazard Hotline Service.

4. Coordination of the release of data required in this section is the responsibility of the department chairperson or equivalent level supervisor in areas other than academic units in conjunction with the Human Resources Office.

D. Physicians' Written Opinions

For routine medical examinations required under this section, the Human Resources Office shall obtain a written opinion from the examining physician which shall include:

1. Any information required under the existing standard for which the examination was conducted.

2. Any recommendation for medical follow-up.

3. The results of the medical examination and associated tests.

4. Any medical condition which may be revealed in the course of the examination which may place the employee at risk as a result of an exposure to the hazardous agents which will be encountered in the laboratory setting.

5. A statement that the employee has been informed of the results of the medical examination and/or consultation and any medical condition that may require further treatment.

6. The written opinion shall not reveal specific findings or a diagnosis of illness or conditions not specifically related to the occupational exposure.

The above information constitutes a medical record and shall be retained by St. Cloud State University for the duration of employment, plus 30 years, as required by CFR 1910.20.

Information from medicals examinations obtained in response to accidental exposures requiring medical treatment shall be forwarded by the Workers' Compensation Coordinator to the:

Department of Employee Relations
Health, Safety and Workers' Compensation Division
P.O. Box 64081
St. Paul, MN 55164-0081
Or information can be faxed to: 612-297-5471

E. Routine Medical Surveillance

Routine medical surveillance shall be initiated whenever required by OSHA or other recognized legal standards.

F. First Aid and Emergency Care

Emergency first aid may be rendered only by persons trained in first aid or as applicable to the Good Samaritan Act. For all Medical Emergency Situations, call Public Safety who will notify Gold Cross Ambulance Service and/or the St. Cloud Department of Public Safety as appropriate.

Standard emergency first aid procedures for eye contact should consist of:

1. Plush the affected eye(s) for a minimum of 15 minutes with clean, fresh water.
2. Remove any contact lenses from the eye before flushing if possible, however, do not delay in flushing the eyes. Be sure the hands have been washed before attempting to remove a contact lens to prevent any chemicals on the fingers from contacting the eyes.
3. Following the eye flushing, patch the eye with a gauze patch and assist the employee with getting medical attention immediately.

Standard emergency first aid procedures for skin contact should consist of:

1. Remove any contaminated or chemical soaked clothing.
2. Wash the affected skin area for at least 15 minutes in clean, fresh water. Do not use soap or any other chemical agent on the skin.
3. After washing the affected area, if there are signs of redness or tenderness, seek medical attention as soon as possible.
4. Do not handle contaminated clothing with unprotected skin.

Standard emergency procedures for inhalation emergencies should include:

1. Remove the affected person to fresh air as soon as possible.
2. If emergency medical assistance is needed, call Public Safety (ext. 3333)

VI. Personal Protective Apparel and Equipment

A. Selection of Equipment

The selection of all equipment required in this standard shall be reviewed by the Chemical Hygiene Safety Committee, Chemical Hygiene Officer, Joe Teff, Director of Safety and Environmental Health, and/or the Safety Administrator prior to issuance.

B. Use of Personal Protective Equipment

Whenever required, the use of personal protective equipment shall be used as instructed. Failure to use the provided equipment may result in injury/illness and shall result in disciplinary action.

C. Protective Eye and Face Wear

The use of eye and/or face protection shall be required where there is a risk of eye or face injury due to the nature of the process or potential for contact with hazardous material.

Protective eye and face wear shall conform to ANSI Z-87, protective eye wear standard.

When working with corrosive materials which may splash to the face, a full face shield should be worn, with splash proof goggles under the face shield.

Damaged and worn out eye protection (scratched, foggy, etc.) are safety hazards and must be replaced. Eye protection should be inspected prior to each use. Defective equipment should be reported to the laboratory supervisor and removed from service.

Laser safety eyewear shall be approved by the LSO (John Sinko) and conform to OSHA and Z136.1 standards for UV eyewear.

D. Protective Gloves and Clothing

Where protective clothing is required, the clothing shall be selected as to provide adequate protection from the hazardous materials which will be most likely encountered. Selection shall be done with the approval of the Chemical Hygiene Safety Committee and Chemical Hygiene Officer, Joe Teff.

Equipment selection shall be based on manufacturers published performance data, or other similar data sources.

All protective coats, suits and gloves should be inspected prior to each use. Defective equipment should be reported to the laboratory supervisor and removed from service.

E. Respiratory Protection

When required, respirators shall be used to reduce employee exposures to hazardous agents. Respirators issued under this section shall be done in accordance with OSHA 29 CFR 1910.134, the Respiratory Protection Standard.

Respirator selection shall be made by the Safety Administrator, Chemical Hygiene Officer, Joe Teff, and the Chemical Hygiene Safety Committee, based on the maximum expected use concentration of the hazardous agent. The respirator selection may be reviewed with the DOER Certified industrial Hygienist prior to issuance.

Respirators shall be required for the following operations:

1. Asbestos removal HEPA filter on Full Mask or PAPR Turbo Unit
2. Spill clean-up appropriate filter for the spill on half mask, full mask, or PAPR Turbo Unit
3. Pesticides Organic Vapor on half mask, full mask, or PAPR Turbo Unit

F. Fume Hood Use

• Routinely use a fume hood when working with flammable chemicals or with volatile or dust-producing toxic chemicals having a TLV (Threshold Limit Value) or PEL

(Permissible Exposure Limit) less than 50 ppm or 100 mg/m^3 (see Chemical Lists # 8 & 23 which can be found in Appendix 17). Because some chemical odor thresholds are above dangerous levels, use a fume hood when working with chemicals which have odor recognition thresholds greater than or nearly equal to their TLVs.

• A fume hood works most efficiently when the hood sash is down, so when in use, keep the hood sash as far down as possible for the work that you are performing. If the fume hood is on, but not in use, close the hood sash.

• A piece of tissue or tape can be attached to the bottom of the fume hood sash as a guide to confirm air flow.

• Most efficient ventilation in a fume hood is achieved when work is performed at least six inches from the front and back of the hood.

• Because potentially explosive perchlorates can form within the ductwork of most fume hoods, perform work involving hot or boiling perchloric acid only in a perchloric acid fume hood. Ask a Laboratory Specialist which fume hoods meet these requirements.

• While in use, avoid placing your head within the fume hood.

• Because items stored in the hood can block the vents and reduce ventilation, fume hoods should not be used as long term storage sites. Currently, however, the chemistry department does not have adequate ventilated storage, so it is necessary for the department to store some materials in fume hoods.

• Report malfunctioning fume hoods to Building and Grounds and a Laboratory Specialist.

• Routine fume hood monitoring in Wick Science building will be the responsibility of the Laboratory Specialist and the COSE CHO.

• If a situation arises in which you question whether or not a fume hood will be able to contain the hazardous vapors or dusts generated during a reaction, please consult the Laboratory Specialist.

G. Emergency Notification Systems

Where emergency notification systems have been installed, they shall be maintained by Electrical Services staff.

Emergency notification systems shall be inspected and tested annually.

Emergency notification systems in this facility include:

1. Fire Alarm
2. Telephone in laboratory or work area
3. Fixed point monitoring system alarm

Actions to be taken in the event of an alarm notification are:

1. Fire Alarm – Actions: Call Public Safety (308-3333)
2. Telephone - Actions: Call Public Safety (308-3333)
3. Fixed point monitor alarm: Call Public Safety (308-3333)
4. Contact Chemical Hygiene Officer, Joe Teff, or Director of Safety and Environmental Health (308-2145)

H. Emergency Showers and Eye Washes

Emergency showers and eye washes are located in laboratories and are labeled as: Emergency Shower and/or Eye Wash.

Emergency showers and eye wash areas shall be kept free and clear of all non-emergency materials as not to restrict employee access.

These facilities are for emergency use. Tampering with these facilities will result in disciplinary action.

Standard emergency procedures for eye contact shall consist of:

1. Flush the affected eye(s) for a minimum of 15 minutes with clean, fresh water.
2. Remove any contact lenses from the eye before flushing if possible. However, do not delay in flushing the eyes.
3. Following the eye flushing, patch the eye with a gauze patch and have the employee seek medical attention immediately.

Standard emergency procedures for skin contact should consist of:

1. Remove any contaminated or chemical soaked clothing.
2. Wash the affected skin area for 15 minutes in clean, fresh water. Do not use soap or any other chemical agent on the skin.
3. After washing the affected area, are there signs of redness or tenderness, if so seek medical attention as soon as possible.
4. Do not handle contaminated clothing with unprotected skin.

I. Fire Protection and Fire Extinguishers

Fire protection to the laboratory area is provided by sprinklers and/or fire extinguishers.

In case of a fire in the laboratory, the emergency actions to be taken are:

1. Activate fire alarm.
2. Evacuate area.
3. Close doors to fire area.

4. Evacuate to designated meeting area, the laboratory supervisor shall account for laboratory personnel.

Fire extinguishers are located in each laboratory.

Selection and installation of fire protective equipment shall be reviewed and approved by the Chemical Hygiene Officer, Joe Teff, Plant Management, and the Director of Environmental Health & Safety prior to purchase.

Fire protective systems shall be inspected and maintained by Physical Plant. Inspection records will be maintained by the Safety Administrator.

Fire extinguisher training shall be made available on an annual basis, as required by 29 CFR 1910.157 "Portable Fire Extinguishers" standard. This training shall include the general principles of fire extinguisher use, the classes of fires, and the appropriate fire extinguisher for each class of fires. Training shall be provided upon initial assignment of the extinguisher then annually thereafter.

VII. Laboratory Security

Laboratory security has evolved in the past decade, reducing the likelihood of some emergencies and assisting in preparation and response for others. Most security measures are based on the laboratory's vulnerability. Risks to laboratory security include, but are not limited to:

1. Theft or diversion of chemicals, biologicals, and radioactive or proprietary materials, mission-critical or high-value equipment.

2. Threats from activist groups.

3. Intentional release of, or exposure to, hazardous materials.

4. Sabotage or vandalism of chemicals or high-value equipment.

5. Loss or release of sensitive information.

6. Rogue work or unauthorized laboratory experimentation.

Security systems in the laboratory are used to detect and respond to a security breach, or a potential security breach, as well as to delay criminal activity by imposing multiple layered barriers of increasing stringency. A good laboratory security system will increase overall safety for laboratory personnel and the public, improve emergency preparedness by assisting with preplanning, and lower the organization's liability by incorporating more rigorous planning, staffing, training, and command systems and implementing emergency communications protocols, drills, background checks, card access systems, video surveillance, and other measures. The security plan should clearly delineate response to security issues, including the coordination of institution and laboratory personnel with both internal and external responders.

VIII. Records

A. Fume Hood Monitoring Records

Chemical fume hoods shall be used as detailed in Prudent Practices for Handling Hazardous Chemicals in Laboratories. A copy of the book Prudent Practices is located in the Safety and Environmental Health Office, Facilities Management Room 102K.

The performance of laboratory chemicals fume hoods and cabinets shall be monitored by the Safety and Environmental Health Office annually. The performance of biological hoods shall be the responsibility of the laboratory supervisor.

Fume hood monitoring shall be done in accordance with accepted industrial hygiene practice.

Annual fume hood monitoring records shall be maintained at the Safety and Environmental Health Office, Facilities Management Room 102K.

Prior to use, each fume hood or biological hood should be operationally checked to ensure that the hood is operating. This can be accomplished by:

1. Listen for the sound of the fan.

2. Check sash to ensure it functions properly, and protective glass is not cracked. Any problems should be reported to Physical Plant.

B. Employee Exposure Monitoring Records

Employee exposure monitoring records will be maintained in accordance with OSHA 29 CFR 1910.20, by the Safety and Environmental Health Department.

C. Departmental Equipment Inspection Records

Equipment inspection records will be maintained by the laboratory supervisor – see Appendix I.

D. Departmental Equipment Maintenance Records

Equipment maintenance records will be maintained by the laboratory supervisor in the laboratory and/or work area – see Appendix I.

E. Inventory and Usage Records

Hazardous materials inventory and use records will be maintained by each laboratory supervisor and the Environmental Health & Safety Department.

F. Medical Records

Medical records will be maintained in accordance with OSHA 29 CFR 1910.20 by the Workers' Compensation Coordinator in the Human Resources Office.

G. Accident Investigation Records

Accidents will be investigated by the Safety Administrator, Chemical Hygiene Officer, Joe Teff, and the Workers' Compensation Coordinator. All records will be maintained by the Workers' Compensation Coordinator in the Human Resources Office in the Administration Building Room 204.

H. Laser safety and Radiation records will be maintained per OSHA and Minnesota Health Department requirements.

IX. Signs and Labels

A. Hazard Identification/Labeling

All hazardous materials will be labeled to clearly identify the name of the hazardous agent and an appropriate hazard warning.

Labeling requirements will conform to federal and state Right-to-Know standards.

It is the responsibility of each person working with hazardous materials to ensure all materials and containers are properly labeled. Any unlabeled material or containers should be reported to the area supervisor or the Chemical Hygiene Officer, Joe Teff.

Where the area itself contains a hazard, the entrance to the area shall be labeled and the area shall be included on the University Hazardous Area list which is located in the Safety and Environmental Health Office. The entrance label should include all pertinent information on the hazardous condition or material (biohazard, radiation, chemical, etc.) also and contact person for this area.

B. Material Safety Data Sheets (MSDS) or (SDS) Safety Data Sheets (https://msdsmanagement.msdsonline.com/company/39ABD836-72E5-4CED-92C9-708731CAFC19)

The MSDS or SDS sheets will be maintained by the area supervisor/technician and will be accessible to the area employees and/or students.

C. Identification of Emergency Equipment

Emergency equipment will be identified by color coding and/or labeling of the equipment.

The labeling scheme is as follows:

1. Fire Extinguishers, red or yellow color.

2. First Aid Kits: Selection and maintenance of materials contained within the department first aid kit for an area is the responsibility of the area supervisor/technician. The colors may be either white or blue.

D. Identification and Designation of Restricted or Designated Areas

Designated or restricted areas shall be posted “Restricted Area, Authorized Personnel Only” and should be included on the University Hazardous Area list which is located in the Safety and Environmental Health Office.

To the extent necessary, the Chemical Hygiene Officer (Joe Teff), Laser Safety Officer (John Sinko), Radiation Safety Officer (Oladele Gazal) and the Chemical Hygiene Safety Committee, may develop Designated or Regulated areas within the laboratories. Those areas will be limited to access by persons aware of the hazards and substances in use and aware of necessary safe working practices.

Unauthorized individuals will not be permitted in a Designated or Regulated area.

E. Emergency Response Information/Requesting Emergency Assistance

Emergency assistance is available on campus 24 hours a day, seven days a week by calling Campus Security. Should you need assistance, dial 8-3333 from any campus phone (or 308-3333 from any off campus or cell phone) and give the officer the following information:

Immediately announce that it is an emergency situation, and then give

• Your name
• Your location on campus--please be specific (e.g. Wick Science Building, Room 344)
• A brief description of the situation

Remain on the phone until instructed to hang-up. If you feel that an ambulance is needed, please bring this to the attention of the security officer immediately so that an ambulance can respond as quickly as possible.

SCSU EMERGENCY TELEPHONE NUMBERS

From a campus telephone, dial the numbers listed below to obtain assistance:

Public Safety Department	8-3333
Fire Emergency	911
Poison Control Office	9-1-800-222-1222
Facilities Management	8-3166
Interim Dean of COSE - Adel Ali	8-2192
Interim Associate Dean COSE - Dale Buske	8-2192
Building Coordinators WS, Annex, ISELF, Headley - Kurt Helgeson	8-3127
ECC - Mark Petzold	8-4182
Department Chair Persons:	
Atmospheric & Hydrologic Sciences: Tony Hansen	8-2009
Biology: Maureen Tubbiola	8-4736
Chemistry & Biochemistry: Becky Krystyniak	8-2024
Computer Science & Information Technology: Ramnath Sarnath	8-4960
Electrical & Computer Engineering: Md (Mahbub) Hossain	8-5319
Environmental & Technological Studies: Kurt Helgeson	8-3127
Mechanical & Manufacturing Engineering: Ken Miller	8-5522
Mathematics & Statistics: Keith Agre	8-2987
Physics & Astronomy: Chris Kvaal	8-4138
Safety Administrator: Joe Teff	8-2145
Chemical Hygiene Officer COSE: Joe Teff	8-2145
Radiation Safety Officer: Oladele Gazal	8-3989
Laser Safety Officer: John Sinko	8-4183 or 5607

MEDICAL EMERGENCIES

Each laboratory and the stockroom in the Wick Science Building is equipped with a first aid kit. These kits, which contain a booklet of basic first aid guidelines, are designed to be used for minor injuries only. Please act within the boundaries of your training and expertise. Disposable gloves must be worn any time the potential for exposure to an open wound exists.

If the situation involves an injury beyond the scope of the first aid kit supplies and your expertise as a responder, please call Campus Security at 8-3333.

Chemical contact with the eyes:

- Take the exposed person immediately to the nearest eyewash station.
- Flush the eyes for at least 15 minutes.
- Eyelids must be held open with the eyeballs continuously rotating for optimum flushing.
- Call Campus Security (8-3333). The officer will assess the situation and arrange for further medical treatment.

Ingestion of chemicals:

- Call the Poison Control Hotline at 1-800-222-1222 for advice on first aid.
- Do not induce vomiting unless specifically instructed to do so by trained medical personnel.
- Call Campus Security (8-3333). The officer will assess the situation and arrange for further medical treatment.

Contact of chemicals with the skin over a large part of body:

- Help the exposed person immediately to the safety shower, and flush the exposed skin for at least 15 minutes. Remove a person's goggles only after washing their head.
- In student laboratory situations, ask all students to evacuate the room.
- Enlist the assistance of a staff person or a student of the same gender as the exposed person. It is helpful to have more than one person assisting the exposed person.
- For the removal of contaminated shirts or sweaters, avoid contaminating the face and eyes of the victim by cutting the clothing so it may be pulled away.
- Remove all layers of contaminated clothing, shoes and jewelry.
- If clothing or jewelry adheres to a chemically-burned area of skin, do not pull it away.

• Call Campus Security (8-3333). The officer will assess the situation and arrange for further medical treatment.

Inhalation of chemical vapors or smoke:

• Relocate the exposed person to an area of fresh uncontaminated air.

• Call Campus Security (8-3333). The officer will assess the situation and arrange for further medical treatment.

SIGNS AND SYMPTOMS OF OVEREXPOSURE TO HAZARDOUS CHEMICALS:

The large number of potentially hazardous chemicals precludes an exhaustive list of the symptoms of overexposure.

Certain signs and symptoms associated with chemical overexposure are also associated with conditions arising independent of contact with any chemical. Thus, the presence of a given sign or symptom need not indicate overexposure to a particular chemical. Conversely, the absence of a particular sign or symptom may not be meaningful since individuals react differently to toxins. Accurate diagnosis of pathological effects, and determination as to whether these effects are associated with overexposure to a particular chemical, must be left to trained medical personnel.

• Consult the MSDS/SDS for signs and symptoms of overexposure before working with a compound.

• Any deviation from an individual's normal state of health, especially in those instances in which that person suspects or knows of chemical overexposure, should be reported immediately to the supervisor.

BUILDING EVACUATIONS

The fire alarm system or "building evacuation alarm" is used to notify all building occupants of the need for immediate evacuation.

Steps for evacuation:

1. Stop all work.
2. Shut off electrical equipment and machines, if possible.
3. Close any opened doors.
4. Exit quickly via the nearest emergency exit.
5. Remain outside of the facility until you are instructed to re-enter by emergency response personnel.

Other things to remember:

- Do not use elevators during an evacuation, which can act as "smoke stacks" for smoke during a fire.
- Avoid blocking access routes to the building and fire hydrants.
- Move away from windows or power lines.
- Avoid interfering with the work of emergency crews.

Fires

Anyone who becomes aware of a situation involving a possible fire should take the following actions:

1. Assist anyone in immediate danger, only if able to do so without endangering yourself.
2. Alert others in the area of the fire and send someone to the nearest building evacuation alarm station to activate the alarm. The person who activated the alarm should call for emergency assistance by dialing 9-911.
3. If the fire is small and you have been trained to use a fire extinguisher, attempt to extinguish the fire by using a fire extinguisher. Please remember:
   - Never fight a fire alone, and
   - Be sure you have a safe escape route, with your back to that exit.

4. If you have any doubts about your ability to extinguish the fire, leave the building.

5. Describe the situation to emergency response officers as they arrive.

Other things to remember:

- Before opening any doors, feel the door's surface with the back of your hand to ensure that the fire has not spread to the room or corridor you wish to enter.

- If smoke is a problem, place a wet cloth over the mouth and nose and stay as low to the floor as possible.

In all situations in which a room has been evacuated due to fire, in which a fire is suspected or in which a fire has been extinguished, Campus Security (8-3333) must be notified immediately so that the local fire department may evaluate the situation and check for unknown fire spread. Also, please remember that the silencing of the fire alarm does NOT mean that the building may be re-entered. Permission to re-enter the building may only be given by emergency response personnel.

Fire Extinguishers

A reminder for trained individuals on the use of a fire extinguisher, remember the acronym P A S S:

- PULL the safety pin out, release the lock latch or press the puncture lever.
- AIM the extinguisher nozzle, horn or hose low at the base of the fire's leading edge.
- SQUEEZE or press the extinguisher's handle to release the extinguishing agent.
- SWEEP the extinguisher from side to side, progressing from the leading edge of the fire toward the fire center, until the fire is extinguished. Extinguishing techniques may vary; in a non-emergency situation, read the directions on the extinguisher.

Appendix 12 contains a listing of the classes of fires and the types of fire extinguishers.

Hair on Fire:

- STOP moving and call for help.
- Using your hands or a lab coat, pat your hair to extinguish the fire.

Then:

- Cool mildly burned areas with clean water.
- Call Campus Security (8-3333). The officer will assess the situation and arrange for further medical treatment.

Clothing on Fire:

- STOP moving and call for help.
- DROP to the floor or other horizontal surface.
- ROLL to smother the flames and to keep flames from the face and hair.

Note: A fire blanket (or even a lab coat) can be used to help extinguish fires.

Then:

- Cool mildly burned areas and clothing with clean water.
- Call Campus Security (8-3333). The officer will assess the situation and arrange for further medical treatment.
- A safety shower may be used to help extinguish clothing on fire ONLY if the victim is in the immediate vicinity of the shower. NEVER run a long distance to a shower since this will only intensify the fire.

- A fire blanket, if available, may be brought to the victim after first attempts have been made, and can be used to cushion the victim on the floor or keep the victim warm if doused with water.

Bomb or Arson Threats

If you become directly involved in such a situation by receiving or becoming aware of any bomb or arson threat, your response should be to immediately call SCSU Campus Security at 8-3333. Information concerning such threats must be kept confidential--do not share this information with anyone, unless directed to do so by emergency response agencies.

Explosions

Any situation involving an explosion should be handled as a fire emergency by:

1. Assisting anyone in immediate danger, only if able to do so without endangering yourself.

2. Alerting others working in the area.

3. Activating the nearest building evacuation alarm station on your way out of the building.

4. Calling for emergency assistance by dialing 8-3333.

5. Describing the situation to emergency response officers as they arrive.

Chemical Spills

The assessment of a chemical spill and the decision of whether to take action or not is a process which requires very careful consideration of the chemical hazards involved. Ultimately, the responsibility rests with the faculty or staff member(s) in charge of the particular laboratory. Student employees or laboratory students should not be asked to go beyond their level of responsibility to clean-up a spill. Under no circumstance should any clean-up be attempted without the proper personal protective equipment. Chemical spills requiring the use of self-contained breathing apparatus (SCBA) will be handled by the St. Cloud Fire Department.

Spill Clean-Up Information for Faculty and Staff

For small spill clean-up, please take the following steps:

- Alert others working in the area of the spill.
- Contain the spill if possible.
- Carefully read the MSDS/SDS for the chemical(s) involved.
- Assemble the necessary clean-up equipment and personal protective equipment.

General clean-up guidelines:

- For small spills of acids and bases, neutralize the spill with sodium bicarbonate. Flush the material into the sink with plenty of water and rinse the area well.
- For larger spills of acids and bases or spills of other liquids, contain and absorb the spill by using loose absorbent, cat litter or sorbent pads. See Appendix 1 for the location of clean-up supplies.

After liquids have been absorbed:

- Place the chemical and the absorbent material into appropriate containers.
- Tightly seal the container and label it with the chemical contents.
- If possible, store the container in a fume hood. In consultation with the Laboratory Specialist, make arrangements for the proper disposal of the chemical waste.
- Spills involving powdered chemicals should be cleaned up in a manner which minimizes the amount of dust raised. Use damp paper towels or wide paint scrapers to pick up the solids in these situations. Deposit materials into a plastic bag or wide-mouth plastic container and label the container.
- For spills of especially toxic chemicals, plans should be made for the clean-up, including the kinds of protective apparel needed and follow-up solvent wipes.

For spills requiring assistance from emergency response personnel, please take the following steps:

- Alert others in the area and immediately evacuate the room. Close the door.
- If you feel the situation warrants total evacuation of the building, activate the nearest building evacuation alarm pull station.
- From a safe location call for emergency assistance by dialing 8-3333. SCSU Campus Security and the St. Cloud Fire Department will respond. If the situation is beyond what the St. Cloud Fire Department can safely handle, the St. Cloud Fire Department will call in the St. Cloud.

Spill Clean-Up Information for Student Employees:

As a general guideline, spills of chemicals having a HMIS H, F or R value of 4 should not be cleaned up by a student employee or a student in lab. Additionally, spills involving chemicals of unknown toxicity, flammability or reactivity should not be cleaned up by these groups. A member of the chemistry department should assume responsibility in these situations, or Campus Security (8-3333) should be called.

General Clean-Up Steps (Only for HMIS < 4)

• Alert others working in the area of the spill. Enlist the assistance of a Chemistry faculty or a laboratory specialist if you are uncomfortable cleaning up the spill.

• Carefully read the MSDS/SDS for the chemical(s) involved.

• For small spills of acids and bases, neutralize the spill with sodium bicarbonate. Flush the material into the sink with plenty of water and rinse the area well.

• For small spills of other liquids, contain the spill by using loose absorbent, kitty litter or sorbent pads. Scrape up the absorbent and put it into a container. Label the container with contents.

• Spills involving powdered chemicals should be cleaned up in a manner which minimizes the amount of dust raised. Use damp paper towels or wide paint scrapers to pick up the solids in these situations. Deposit materials into a plastic bag or wide-mouth plastic container and label the container.

• For container disposal, notify a Laboratory Specialist.

General steps for chemicals having HMIS values of 4

• Alert others working in the area.

• Evacuate the room. Total evacuation of the building may be necessary in certain situations.

• Find a Chemistry faculty or laboratory specialist and inform them of the spill. If no Chemistry department member is available, call SCSU Campus Security (8-3333).

Under no circumstance should any clean-up be attempted without the proper personal protective equipment or clean-up supplies.

Mercury Clean-Up:

Due to the toxicity of mercury vapors, all mercury spills must be cleaned up thoroughly and promptly.

1. Consolidate as many of the droplets as possible by "pushing" them together with an index card or other stiff piece of paper.
2. Using the mercury vacuum available in the stockroom, vacuum up all traces of the mercury. Carefully, inspect the area to ensure that all of the mercury was cleaned up. To remove all mercury from the vacuum tubing, suck up a small amount of water with the vacuum. Inspect the tubing to ensure that all mercury has been removed. Note: Do not use a standard shop vac for cleanup activities.

3. Remove the mercury from the vacuum collection cup by opening the cup's top and pouring the mercury out into either an existing mercury collection container or another separate container (make sure that this container is properly labeled).

Mercury must not be left in the collection cup! Any other material contaminated with mercury (sand from a sand bath, glassware, etc.) should be collected and treated as hazardous waste.

Severe Weather

The Building Coordinator will monitor weather radios for any indication of potentially dangerous weather. If the need to take shelter exists, the Building Coordinator will attempt to notify department chairpersons and other supervisors. It then is the responsibility of these notified individuals to take immediate action to notify those in their building or area of this information, and to stay alert for changing conditions. Please be aware that the weather sirens from the city of St. Cloud will probably not be heard in the Wick Science Building.

Should conditions exist which require everyone to take shelter, these steps should be followed:

- In the Wick Science Building take shelter in the basement. In Brown Hall take shelter in the lower central corridors of the building, away from the exits.
- Take a radio along, preferably one that is battery operated.
- Stay away from glass.
- Stay clear of electrical panels.
- Avoid overcrowding.

Shelter should be taken by all persons for a period of time well in excess of any possible danger.

Electrical or Utilities Failures

In case of an electrical utilities failure, the ventilation system to the building and the laboratory exhaust fans will not operate.

The following procedures should be followed:

1. Begin shutting down experiments as soon as possible.
2. Close the sash on all laboratory hoods in use in order to contain materials and vapors in the hood.
3. Keep the doors to cold rooms and cabinets closed to conserve energy.
4. Advise the maintenance department of the power failure by calling Physical Plant.

In case of a utilities failure involving the water supply, the following procedures should be followed:

1. Discontinue all experiments requiring water for cooling or control purposes. Turn off all water faucets in use.
2. Discontinue experiments involving hazardous materials for which emergency showers and eye washes are required, since these will not function.
3. Advise the Physical Plant of the utilities failure.

In case of a utilities failure involving the gas supply, the following procedures should be followed:

1. Discontinue all experiments requiring gas heating.
2. Turn off all gas operated apparatus.
3. Advise the Physical Plant department of the gas failure.

X. Training and Information

A. Employee Training Program

Prior to initial assignment, each laboratory employee will receive training on the, as well as applicable Right-to-Know training for the hazardous materials, infectious agents and physical hazards which may be encountered in the laboratory.

Training will be conducted by the laboratory supervisor or department chairperson. Training records will be retained by the laboratory supervisor/technician and department chairperson. Copies of these records will be forwarded to the Safety and Environmental Health Office where they will be retained for five (5) years. The SCSU Employee Health & Safety training Record form will be supplied by the Safety and Environmental Health department to maintain uniformity.

B. Hazards Detection

As a part of the Right-to-Know training, each employee will be instructed by his/her supervisor or instructor as to the nature of the materials they will be working with and methods of detecting the potential hazard of the material.

Special high hazard materials or work setting will be covered by the Chemical Hygiene Officer, Joe Teff, upon initial assignment to the laboratory.

C. Physical and Health Hazards

Initial Right-to-Know training will be provided by the supervisor of the employee and will include physical job hazards as well as potential health hazards from materials which may be encountered in the laboratory.

D. Personal Protective Measures

Personal protective measures will be covered in the initial Right-to-Know training by the immediate supervisor. Work Practices requiring special protective measures will be covered by the Chemical Hygiene Officer, Joe Teff, to the initiation of the procedure.

E. Chemical Hygiene Plan Training

Prior to initial assignment, each employee will receive training covering the content of this. This training will be provided by the Chemical Hygiene Officer, Joe Teff.

XI. Waste Disposal

A waste management plan and how to access that plan shall be in place before work begins on any laboratory activity. The plan should utilize the following hierarchy of practices:

A. Waste Management Plan

1. Reduce waste sources. The best approach to minimize waste generation is by reducing the scale of operations, reducing its formation during operations, and, if possible, substituting less hazardous chemicals for a particular operation.
2. Reuse surplus materials. Only the amount of material necessary for an experiment should be purchased, and, if possible, materials should be reused.
3. Recycle waste. If waste cannot be prevented or minimized, the organization should consider recycling chemicals that can be safely recovered or used as fuel.
4. Dispose of waste properly. Sink disposal may not be appropriate. Proper waste disposal methods include incineration, treatment, and land disposal. The organization's environmental health and safety (EHS) office should be consulted in determining which methods are appropriate for different types of waste.

B. Waste Segregation

As a part of the hazardous waste minimization program, all laboratory hazardous wastes must be segregated prior to disposal. Department chairpersons and laboratory supervisors/technicians are required to follow the provisions of the Hazardous Waste Management Guidelines.

1. Chemical waste should be accumulated at or near the point of generation, under the control of laboratory supervisors.
2. Each waste type should be stored in a compatible container pending transfer or disposal. Waste containers shall be clearly labeled and kept sealed when not being actively filled.
3. Incompatible waste types shall be kept separate to ensure that heat generation, gas evolution, or another reaction does not occur.
4. Waste containers should be segregated by how they will be managed. Waste containers should be stored in a designated location that does not interfere with normal laboratory operations. Ventilated storage and secondary containment may be appropriate for certain waste types.

5. Waste containers shall be clearly labeled and kept sealed when not being actively filled. Labels should include the accumulation start date and hazard warnings as appropriate.
6. Non-explosive electrical systems, grounding and bonding between floors and containers, and non-sparking conductive floors and containers should be used in the central waste accumulation area to minimize fire and explosion hazards. Fire suppression systems, specialized ventilation systems, and dikes should be installed in the central waste accumulation area.
7. Waste management workers shall be trained in proper waste handling procedures as well as contingency planning and emergency response. Trained laboratory users most familiar with the waste should be actively involved in waste management decisions to ensure that the waste is managed safely and efficiently. Engineering controls should be implemented as necessary, and personal protective equipment should be worn by workers involved in waste management.

C. Disposal Procedures

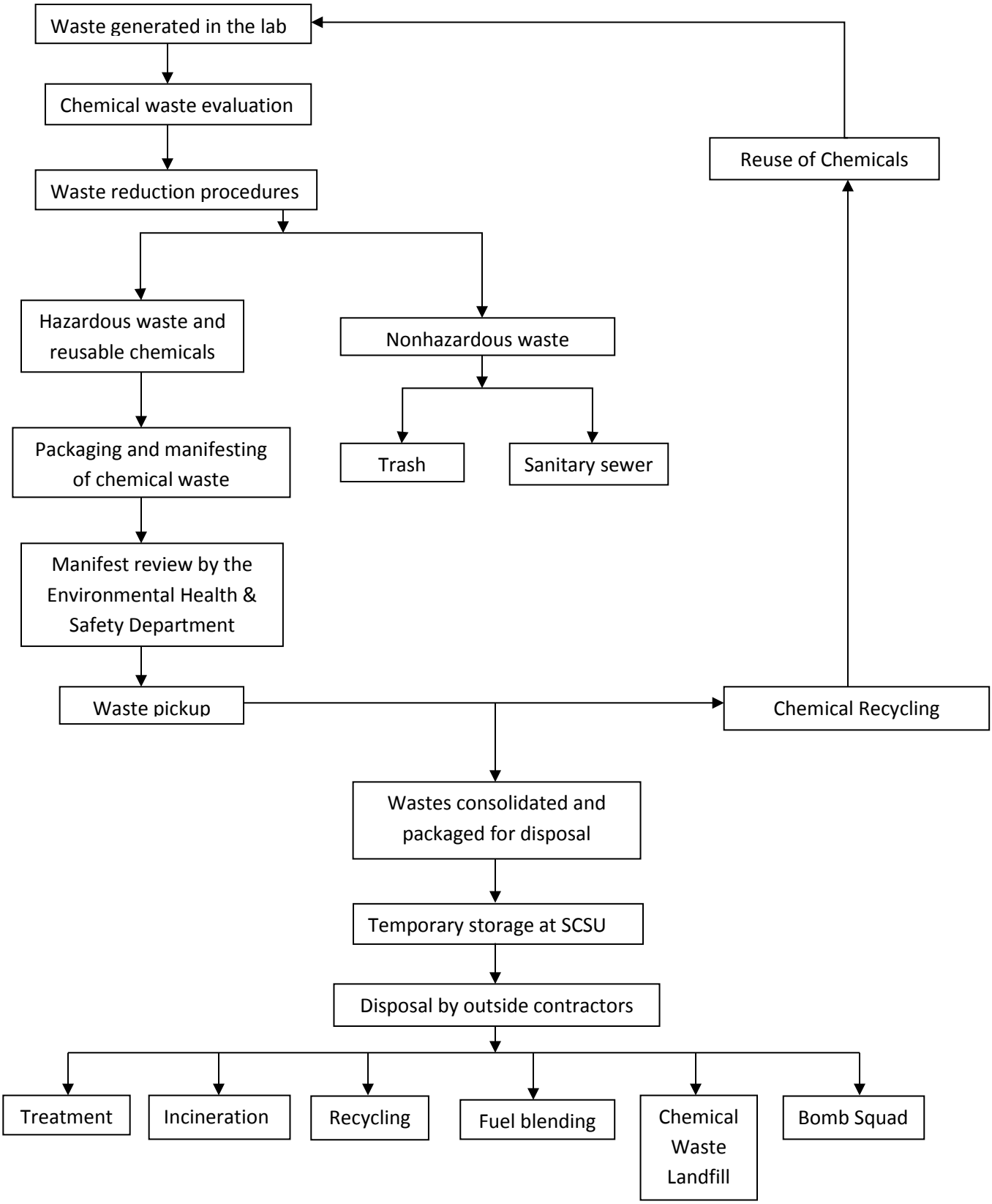
The responsible parties for waste handling on site is the Director of Environmental Health & Safety and Jeff Stobb, Chemistry & Biochemistry Department College Laboratory Services Specialist, or Brian Lorenz, Biology Department College Laboratory Services Specialist, and can be contacted for clarification of any questions regarding the information contained in the Hazardous Waste Management Guidebook.

D. Hazardous Waste

1. All department chairpersons, laboratory supervisors/technicians shall be familiar with and follow the provisions of the Hazardous Waste Management Guidebook.

2. The following flow chart describes the waste management process to be followed by department chairpersons, laboratory supervisors/technicians who are involved in handling, use, storage, and disposal waste stream of hazardous and non-hazardous materials.

Waste Chemical Management Flow Chart
St. Cloud State University



Chemical Waste Management

Laboratory work involving chemicals generates wastes with limited potential outcomes; these outcomes include recovery, recycling and reclamation, reuse, treatment or proper disposal. Ultimately, the decision-making responsibility rests with the person who generated the waste. The chemical waste management guidelines below will assist these individuals in making ethically and environmentally-sound decisions.

Waste Minimization

Every attempt should be made to minimize the use of hazardous chemicals and the generation of hazardous waste by considering the following:

1. Reduction of the scale of the experiment

2. Substitution of hazardous reagents with less-hazardous ones

3. Recovery of unused starting materials for reuse

4. Limit commingling of non-hazardous and hazardous waste

5. Disposal or recycling of waste

Hazard Determination for Chemical Waste

A Hazard Determination must be completed for each chemical waste generated in lab for which the hazard status is unknown. The forms needed to carry out these Hazard Determinations are included as part of this Chemical Hygiene Plan (Appendix 5 and Appendix 6).

Each course should build a collection of these determinations for future reference. These collections should be reviewed periodically to establish whether the hazard determinations are still correct based on current hazardous waste guidelines. Once the hazard determination has been completed, the following guidelines as to the treatment, collection and disposal of the waste should be followed.

Disposal of Non-Hazardous Waste
If a waste has been determined to be non-hazardous following the hazard determination process described in section 6.2, a decision on whether or not this waste should be collected, sewered, or thrown in the trash must be made.

Non-hazardous waste that cannot be sewered

SCSU is connected to the St. Cloud Publicly Owned Treatment Works (POTW). The City of St. Cloud, in Ordinance No. 1046, Section 360:40, sets guidelines for substances, which are prohibited from discharge into the St. Cloud POTW. The following is a list of wastes which are restricted from being sewered at SCSU. These wastes should be collected and handled as hazardous waste, unless they are determined to be a solid which can be thrown in the trash. Examples of such solids include, but are not limited to, sand, ashes, stone, glass, plastic, wood, and coffee grounds.

1. Any combustible, flammable or explosive solids, liquids, or gases which by their nature or quantity will or are likely to cause, either alone or by interactions with other substances, a fire or explosion or be injurious to the POTW operations. Prohibited materials include, but are not limited to, gasoline, kerosene, naphtha, fuel oil, lubricating oil, benzene, toluene, xylene, ethers, alcohols, and ketones.

2. Any solids or viscous substances which will or are likely to cause obstruction to the flow in a sewer or interference with the operation of the waste water treatment plant. These include garbage with particles greater than one-half inch (1/2") in any dimension, grease, animal guts or tissues, bones, hair, hides or fleshings, entrails, feathers, ashes, sand, spent lime, stone or marble dust, metal, glass, grass clippings, rags, spent grains, waste paper, wood, plastic, gas tar, asphalt residues, residues from refining or processing of fuel or lubricating oil, glass grinding and polishing wastes.

3. Any waste water having a pH less than 5.0 or greater than 12.0 or having any corrosive property that will or is likely to cause damage or hazard to structures, equipment, or an employee of the Water Utility.

4. Any waste water containing toxic or poisonous pollutants in sufficient quantity, either singly or by interaction with other pollutants that will or is likely to cause interference or constitute a hazard to humans.

5. Any noxious or malodorous solids, liquids, or gases, which either singly or by interaction with other wastes, will or are likely to create a public nuisance or hazard to life or prevent the entry of water utility employees into a sewer for its monitoring, maintenance, and repair. Thiols would be an example of non-hazardous, malodorous compounds which should not be sewered.

6. Any waste water which will or is likely to cause excessive discoloration in treatment plant effluent. (e.g. dyes and indicators in concentrations > 1%)

7. Wastes, other than Domestic Wastes, that are infectious before discharging into the sewer.

8. Any waste water containing inert suspended solids (including lime slurries and lime residues) or dissolved solids (including sodium chloride) in such quantities that will or is likely to cause interference with the POTW.

9. Radioactive wastes or isotopes of such a half-life or concentration that they are in non-compliance with standards issued by the appropriate authority having control over their use and which will or are likely to cause damage or hazards to the POTW or employees operating it.

10. Any waste water containing fat, wax, grease or oil in excess of 100 mg/l that will or is likely to solidify or become viscous at temperatures between 0° and 65°C and which will or is likely to cause obstruction to the flow in sewers or other interference to the POTW, including petroleum oil, non-biodegradable cutting oil, or products of mineral oil origin.

General guidelines for compounds that can be sewered

Any non-hazardous waste that can be sewered must be disposed of in a manner which is consistent with the following guidelines:

1. The quantities of actual chemicals disposed of down the drain generally should be limited to not more than a few hundred grams or milliliters. Also, all solids should be in solution with water.

2. The disposal should be performed by flushing with a significant excess of water at the sink, so that the chemicals are removed from the system.

A note on dilution of a waste prior to sewering--the City of St. Cloud states the following:

"No user [of the St. Cloud Water Pollution Control Facility] shall increase the use of process water or, in any way, attempt to dilute a discharge as a partial or complete substitution for adequate treatment to achieve compliance with the limitations contained in any state requirements or federal pretreatment standards." (Ordinance 1046 Section 360:45 Subp. 4)

Disposal of Hazardous Waste

Those non-recoverable and non-treatable wastes which have been determined to be hazardous, according to the Hazard Determination guidelines in section 6.2, must be collected and labeled according to the following guidelines:

1. The waste must be collected in compatible containers.

2. The containers must be covered with proper caps at all times, except for when waste is being added or removed from the containers. The containers must, "have lids, caps, hinges, or other closure devices of sufficient strength and construction so that when closed they will withstand dropping, overturning or other shock without impairment of the container's ability to fully contain the hazardous waste." (MN Rules 7045.0526 Subp. 2. A)

3. The container label must include the following: (MN Rules 7045.0292 Subp. 6. C. & F.)

   • Complete chemical description of the waste

   • The words, "Hazardous Waste"

   • Accumulation Start Date

4. It is helpful to consider the type of hazardous waste being collected and how this waste will react in the different environments it may encounter before its final disposal. An example would be a designation of the level, say three-fourths full, to which a container may be filled, allowing for expansion if the waste should be exposed to high and/or low temperatures. In student laboratory situations, a mark on the bottle indicating this level

may be very prudent. Copies of the department's waste labels are available in the stockroom.

Hazardous Waste Storage and Inspection

According to the Minnesota Pollution Control Agency guidelines, there are two regulations which apply to storage and inspection of hazardous waste. They are:

1. Containers that hold free liquids must be placed on a containment surface that is impermeable to the
   waste stored. (MN Rules 7045.0292 Subp. 6.)

2. Weekly inspections of hazardous waste containers and areas where containers are stored should be conducted. The Laboratory Specialist conducting the inspection must look for leaks and signs of deterioration caused by corrosion or other factors, and written records of the dates and findings of these inspections should be kept. (MN Rules 7045.0626 Subp. 5.

3. Waste generators should notify the laboratory specialist about the location of any waste being stored.

4. Waste can only be stored for 180 days from the time of accumulation.

Hazardous Waste Treatment

Under the regulatory guidelines of the Environmental Protection Agency and the Minnesota Pollution Control Agency, generators of waste, whether they are students or laboratory employees, are allowed to treat waste to decrease or eliminate the hazardous characteristics of the waste. However, this treatment must proceed under the following conditions:

1. Treatment must be performed in a tank or container. (Federal Register, Vol. 51; #56, March 24, 1986)

2. Waste containers should only be opened for the addition or removal of waste.

3. Treatment must take place within the waste accumulation time limitations. St. Cloud State University is a Very Small Quantity Generator (VSQG), therefore waste must be treated within 180 days of accumulating 1000 kilograms of waste. (MPCA 7045.0292. Subp. 6.H.)

Given these guidelines, the following treatment may be appropriate in the laboratory setting:

• Decomposition

• Ion-Exchange

• Neutralization

• Precipitation

• Oxidation and Reduction

• Others as applicable

For waste minimization purposes, these methods should be employed whenever possible. If students in the laboratory will be carrying out treatment as part of the experiment, explicit instructions must be included in the laboratory manual. Likewise, if other laboratory employees under the direct supervision of the Laboratory Coordinator will be carrying out these steps as part of the experimental procedure (i.e. the steps to be taken are included in the lab manuals), explicit instructions must be available for them also. If the waste is not treated by either students or lab employees, it is the responsibility of the Lab Coordinator to carry out these steps.

The books, "Prudent Practices in the Laboratory: Handling and Disposal of Chemicals", National Research Council, and "Destruction of Hazardous Chemicals in the Laboratory," Lunn and Sansone, contain detailed descriptions for the treatment of many categories of chemical compounds.

Hazardous Waste Recovery, Reclamation and Recycling

Under the MPCA definitions, reclamation means the processing or regeneration of a waste to recover a usable product. In essence, the terms recovery, reclamation and recycling can be used interchangeably.

Waste recovery, reclamation and recycling is regulated rather uniquely. While a waste is being collected and stored prior to these processes, the waste must be managed according to the applicable collection and storage regulations. However, the actual recovery, reclamation or recycling process is outside regulatory constraint. At the end of the process, the regulations applicable to disposal of any resulting hazardous waste, such as still bottoms or residues, need to be followed. In other words, the respective regulations apply before and after the waste is being recovered, reclaimed or recycled, but the actual process itself is not regulated. This is to encourage these types of activities whenever possible.

Disposal of Radioactive Waste

For the handling, storage, and disposal of radioactive waste, refer to the radiation safety manual (Appendix 16) and/or the Radiation Safety Officer.

Appendix I
Personnel Responsibilities

The University President has ultimate responsibility for the CHP within the institution and is dedicated to providing a safe and healthful work environment for all employees and students. All individuals working in the University buildings where chemicals are present are responsible for health and safety in their laboratories, storerooms, classrooms and workshops.

The ability to accurately identify and assess laboratory hazards must be taught and encouraged through training and ongoing organizational support. This training must be at the core of every good health and safety program. For management to lead, personnel to assess worksite hazards, and hazards to be eliminated or controlled, everyone involved must be trained.

Persons responsible for chemical hygiene include, but are not limited to, the following:

A. Upper Level Administration (President, Provost, Vice Presidents, Executive Team Members)

(a) Ultimate responsibility for chemical hygiene within the institution.
(b) Supports a broad-based laboratory safety/chemical hygiene program that will protect laboratory users from health effects associated with hazardous chemicals, and physical or biological hazards.
(c) Ensures that employees assigned laboratory safety responsibilities are provided adequate time and recognition to carry out their responsibilities.
(d) Promotes the importance of safety in all laboratory activities.

B. Facilities Director

(a) Primary responsibility of maintenance of the campus facility and laboratories.

C. Dean of Sciences

(a) Is responsible to support safety in laboratories and help provide the resources as needed to ensure the faculty, staff and student safety.
(b) Ensure timely actions are taken to address safety concerns in laboratories and protect personnel and facilities.
(c) Ensure the Science Department remains in compliance with all applicable codes, regulations and system/institution safety policies.
(d) Provide budgetary arrangement to ensure the health and safety of departmental personnel, students and visitors in the laboratories.
(e) Assigns the Chemical Hygiene Officer responsibilities to a qualified individual.
(f) Assists the Chemical Hygiene Officer in selecting qualified individuals to serve on the Chemical Hygiene Committee.
(g) Ensures that employees assigned laboratory safety responsibilities are provided adequate time and recognition to carry out their responsibilities.
(h) Ensures that adequate time and resources are provided for proper training of all laboratory users.

D. Campus Safety Administrator

(a) Responsible to work with Facilities Director, Dean of Sciences, Chemical Hygiene Officer and Faculty in promoting safety throughout the facility and all laboratories.
(b) Responsible for the safety of the institution by ensuring regulatory compliance and making appropriate recommendations to ALL personnel.
(c) Ensure that there is a written and implemented CHP for the facility.
(d) Ensure that the CHP is reviewed annually and updates are made as needed.
(e) Participates on the Chemical Hygiene Committee.

E. Chemical Hygiene Officer, Joe Teff is responsible for:

(a) Responsible for implementing and documenting appropriate safety policies and procedures in accordance with the CHP.
(b) Working with the management team to develop and implement the appropriate chemical hygiene policies and practices. Work with the Campus Safety Administrator, faculty and other employees to develop and implement appropriate chemical hygiene policies and procedures.
(c) Monitoring the procurement, use and disposal of chemicals in the laboratory.
(d) Conducting periodic reviews of chemical procedures in University space in a timely fashion. Ensures all laboratory inspections (e.g. eyewash, etc.) are maintained.
(e) Assists laboratory supervisors in developing and maintaining adequate facilities.
(f) Disseminating verbal and written current MPCA and OSHA safety regulations to ensure that all laboratory supervisors, as identified in Appendix I, are informed of the legal status of regulated substances and required safety standards.
(g) Ensure the CHP is maintained in accordance with OSHA standards.
(h) Seeks ways to improve the chemical hygiene program.

F. Department Chairperson

(a) Assumes responsibility for personnel engaged in the laboratory use of hazardous chemicals.
(b) Provides the Chemical Hygiene Officer (CHO) with the support necessary to implement and maintain the CHP.
(c) After receipt of laboratory inspection report from the CHO, meets with laboratory supervisors to discuss cited issues and to ensure timely actions to protect trained laboratory personnel and facilities and to ensure that the department remains in compliance with all applicable federal, state, campus and departmental codes and regulations.

G. Campus Safety Committee and/or Chemical Hygiene Committee

(a) Reviews accident reports and makes appropriate recommendations to the department chairperson regarding proposed changes in the laboratory procedures.
(b) Monitors and advises on policies, procedures, equipment and work practices to protect laboratory users from health hazards.

(c) Conducts periodic laboratory inspections to identify any issues that may result in non-compliance with any applicable federal, state, system, campus or departmental rules or regulations.

The President has authorized a Chemical Hygiene Committee. Bargaining unit representatives have confirmed the appointment of the following representatives to serve on the committee from the departments affected by this plan.

Member	**Department**	**Phone**
Jeff Stobb	Chemistry & Biochemistry	308-1743
Marissa Harle	Chemistry & Biochemistry	308-6086
Kannan Sivaprakasam	Chemistry & Biochemistry	308-1692
Russ Lidberg	Physics	308-4858
Elisha Polomski	Physics	308-2774
Steve Ratliff	Physics	308-3274
John Sinko	Physics, Laser safety officer	308-4183
Tim Vogt	Electrical Engineering	308-2997
Steve Covey	Mechanical & Manufacturing Engineering	308-5161
Kurt Helgeson	Environmental & Technological Studies	308-3127
Jim Nicholson	Environmental & Technological Studies	308-4705
Brian Lorenz	Biology	308-4911
Matt Julius	Biology	308-6684
Chris Kvaal	Biology	308-4138
Heiko Schoenfuss	Biology	308-3130
Satomi Kohno	Biology	308-2039
Oladele Gazal	Biology, Radiation Safety Officer	308-3045
Jeff Cheng	AHS	308-1049
Henry Mott	Atmospheric & Hydrological Sciences	308-3260

H. Faculty/Laboratory Supervisor

Each faculty or non-faculty member utilizing a University space for teaching purposes is designated as the laboratory supervisor and has the overall responsibility for the daily functioning of their laboratory, storeroom, classroom and/or workshop. Specific responsibilities include:

(a) Ensuring that employees and students know and follow chemical hygiene rules. This will be accomplished by conducting educational sessions during the first laboratory session of each semester. During this session the chemical safety rules and safe work practices are reviewed with each person who will be working in the laboratory.

(b) In cooperation with the Chemical Hygiene Officer, Joe Teff, determine the proper level of personal protection required for each laboratory operation based on hazard potential of the chemicals and the engineering control methods available. Ensures

laboratory users wear personal protective equipment (PPE) that is required by the chemical's Safety Data Sheet.

(c) Ensuring that required protective clothing and equipment is available and utilized by any person conducting an operation which requires the use of personal protective equipment.

(d) Inspecting and/or monitoring safety equipment in the laboratory to ensure that it has been checked and found to be functional by conducting regular, formal chemical hygiene and housekeeping inspections, including routine inspections of emergency equipment and ventilation hoods. Report all problems to the Physical Plant. Any equipment brought in by an instructor should meet current standards.

(e) Implement the current University practice of regulated substances used in the laboratory. This can be accomplished by contacting the Chemical Hygiene Officer, Joe Teff.

(f) Ensure that proper handling and storage facilities are available for chemicals prior to ordering them and prior to the generating of chemical compounds in the laboratory. Ensure that laboratory personnel comply with the CHP and do not operate equipment or handle hazardous chemicals without proper training and authorization.

(g) Conducts hazard analysis and reviews applicable Safety Data Sheets before assigning work activities to other laboratory personnel.

(h) Assumes responsibility for all students and visitors to ensure all provisions of the laboratory rules are followed.

(i) Maintain and implement safe laboratory practices.

(j) Monitor the facilities and the chemical fume hoods to ensure that they are maintained and function properly.

- Note: Non-faculty laboratory supervisors are defined for purposes of this plan as Excluded Administrators, Managers Plan, Commissioners Plan, Middle Management Association, St. Cloud State University Association of Administrative and Service Faculty, Minnesota Government Engineer Council, AFSCME Council 6 employees and Graduate Assistants who are responsible for laboratory storerooms, classrooms, workshops, and other work areas/places.

I. Laboratory Personnel/Students/Users

Each employee or student is responsible for their health and safety in all University work areas by:

(a) Read, understand, and follow all safety rules and regulations that apply to the work area.

(b) Plan and conduct each operation in accordance with the chemical hygiene safe lab practices.

(c) Promote good personal housekeeping and chemical hygiene practices.

(d) Notify the supervisor of any hazardous conditions or unsafe work practices in the work area.

(e) Use PPE as appropriate for each lab operation that involves hazardous chemicals.

(f) Complete all applicable annual safety training.

(g) Utilizing the knowledge and techniques of the laboratory supervisor and/or Chemical Hygiene Officer, Joe Teff. Included are persons working in storerooms, classrooms, and other areas where chemicals are found.

J. Disciplinary Policy

SCSU is responsible for providing a safe work environment. Therefore, disciplinary action should be taken in situations involving the violation of the safety policies and practices contained in this CHP. In general, the step-wise procedure shown below will be followed for each policy/procedure violated.

Violation Notification Procedure

- Informal notification (informational) – no documentation is kept.
- First violation: Verbal warning – no report is written, but a record will be maintained by the chair of the safety committee that a verbal warning was issued.
- Second violation: Written warning – A written copy of the warning will be given to the laboratory employee that committed the violation, the chair of the safety committee, and the student employment office for student employees or the human resources office and Dean of COSE for faculty and staff.

Appendix II
Additional Information

A. Employee Access to Chemical Hygiene Plan

Each laboratory employee will be provided with a copy of the CHP. A copy of this CHP will be located in each laboratory and affected workplace. Additional copies can be obtained by contacting the Chemical Hygiene Officer, Joe Teff, or the Safety and Environmental Health department.

B. Criteria for Determination of Hazards

Whenever a new chemical process or new product or substance involving a potential hazard is introduced to an instructional research laboratory, storeroom, classroom or other work area, an initial assessment of the potential exposures to employees and students will be conducted by the Chemical Hygiene Officer, Joe Teff. This determination will be made by direct observation or monitoring techniques. This determination will be documented and maintained in accordance with the record keeping provisions of this plan.

Assignments and Re-assignments of chemical activity in University space that require special HVAC, fume hoods or other ventilation and safety devices are subject to prior approval of the Vice President of University Operations.

C. Chemicals Identified and Regulated as Toxic and Hazardous Substances by OSHA

Agents listed in the OSHA standard 29 CFR 1910.1000, Subpart Z shall be handled in accordance with the provisions of the applicable standard. Contact the Chemical Hygiene Officer, Joe Teff, or the Safety and Environmental Health department for a current copy of the standard.

D. Medical Consultation

In the event of suspected or actual overexposure to a hazardous chemical(s) in the course of performing job-related duties, SCSU will provide medical consultation and treatment. This consultation and treatment will be performed without cost to the employee, without loss of pay and at a reasonable time and place.

Whenever medical consultation and treatment for a suspected or actual overexposure to a hazardous chemical(s) is needed, the following information must be exchanged:

Information provided to the physician should include:

• Identity of the chemical, including a copy of the chemical's MSDS/SDS.

• Conditions relating to the exposure.

• Quantitative exposure data if possible.

• Description of the signs and symptoms the employee is experiencing.

Subject to confidentiality laws pertaining to employee confidentiality, the physician will provide both the administrative unit and the employee with a written medical opinion which will include the following:

• Recommendations for medical follow-up.

• Results of medical examinations and tests, as related to the exposure incident.

• Notification of existing medical conditions which may be exacerbated by exposure to hazardous chemicals found in the work place.

• A statement that the employee was informed both of the results of the consultations or examinations and of any medical condition that may require additional diagnosis or treatment.

At SCSU for situations requiring immediate medical attention, please call 9-911. For situations not requiring the assistance of Campus Security, please notify your immediate supervisor. Your supervisor will be responsible for filling out the necessary accident report forms. Please remember that it is absolutely necessary for all suspected and/or actual employee exposure incidents to be properly documented.

E. Safety Rules for Class 2 and 3R or 3A Lasers – Visible Light not exceeding 5mw

Note: Guidelines for Class 3B and 4 lasers are covered in the SCSU Laser Safety plan

Although these "medium -power" lasers present a serious potential for eye injury resulting from intrabeam viewing, they do not represent a diffuse reflection hazard, a skin hazard for momentary exposure, or a fire hazard. Therefore, control measures are concentrated on eliminating the possibility of intrabeam viewing by:

1. Never aim a laser at a person's eye.
2. Use proper safety eyewear if there is a chance that the beam or a hazardous specular reflection will expose the eyes.
3. Permit only trained personnel to operate the laser and do not leave an operable laser unattended if there is a chance that an unauthorized user may attempt to operate the laser.
4. Enclose as much of the beam's path as practicable.

5. Avoid placement of the unprotected eye along or near the beam axis during alignment procedures. This is because the chance of hazardous specular reflections is greatest in this area.

6. Terminate all primary and secondary beams if possible at the end of their useful paths. For alignment procedures consult the SCSU laser safety plan.

7. Use beam shutters and laser output filters to reduce the beam power to less hazardous levels when the full output power is not required.

8. Assure that any spectators are not potentially exposed to hazardous conditions.

9. Attempt to keep the laser beam paths above or below eye level for either sitting or standing positions.

10. Attempt to operate the laser only in a well-controlled area. For example, within a closed room with covered or filtered windows and controlled access.

11. Label lasers with appropriate Class 3 warning statements and placard hazardous areas with warning signs if personnel can be exposed.

12. Mount the laser on a firm support to assure that the beam travels along the intended path.

13. Assure that individuals do not look directly into a laser beam with optical instruments unless an adequate protective filter is present within the optical train.

14. Eliminate unnecessary specular (mirror-like) surfaces from the vicinity of the laser beam path, or avoid aiming at such surfaces.

15. Keep room lighting as bright as possible while lasers are in use.

16. Do not wear reflective jewelry or clothing while operating lasers.