Dickinson College

Art Studio Safety Program

May 30, 2006

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I. Introduction

Laboratory workers and artists are exposed to many of the same hazardous materials, yet artists often underestimate or do not understand the severity of the hazards in their workplace. Even when the hazards are known, art studios are often designed with little consideration given to creating a safe space to work. Artists may feel their academic freedom is being limited by federal, state, and local laws controlling artistic media. To the contrary, artists today have a much wider selection of media with which to work; however, the regulatory environment is changing the way artists perceive their media and encouraging them to work safely in the studio.

Dickinson College realizes our responsibility for the protection of our employees. We hereby institute the enclosed studio safety plan to assist us in our safety program. The Studio Safety Plan establishes the basic safety principles for studio procedures, equipment, and work practices that are capable of protecting employees from physical and health hazards in studios. This document is intended only to highlight those safety measures necessary for achieving a safe and healthy work environment. Where the scope of hazards is not adequately addressed by this general document, the studio supervisor must develop specific Standard Operating Procedures.

This document will hereafter be known as the Dickinson College Studio Safety Plan (DCSSP).

A. Scope and Application

All employees of Dickinson College working in art studios must comply with this document.

B. Responsibility

1. **The President of the College** has ultimate responsibility for studio safety within the institution. General oversight responsibility is assigned to the **Provost of the College**.
2. **The Director of Environmental Health & Safety** advises on matters of material safety policies and practices and:
    - works with administrators and other employees to develop and implement the appropriate safety policies and practices
    - monitors procurement, use, and disposal of chemicals
    - ensures that appropriate audits are conducted
    - helps supervisors develop precautions and adequate facilities
    - knows the current legal requirements concerning regulated substances

- seeks ways to improve the safety plan
- conducts information and general training sessions
- handles requests for monitoring air and/or surface contamination by hazardous materials
- assists with the investigation of accidents involving hazardous materials
- provides necessary information to the healthcare professional when a report of possible overexposure occurs
- schedules testing of studio facilities
- schedules services for hazardous waste disposal
- maintains a resource file of references and publications on safety matters
- writes, or assists supervisors in writing standard operating procedures pertinent to their needs

3. **The Department Chair** is responsible for studio safety in his or her department and ensures that action is taken to correct work practices and conditions that may result in the release of hazardous materials
4. **The Studio Supervisor** is the faculty or staff member under whose instruction hazardous materials are used and/or stored in the studio. The supervisor has a primary responsibility for implementing the DCSSP in the studio and:
    - Ensures that workers know and follow the studio safety program.
    - Ensures that training specific to the studio's procedures and chemicals has been provided
    - maintains the file of material safety data sheets for hazardous materials used in studio.
    - Ensures that the required level of personal protective equipment is available, in working order, and that specific training in its use has been provided
    - Provides regular, formal studio safety and housekeeping inspections including routine inspections of emergency equipment (e.g. – regular tests of eyewash fountains and stocking of first aid cabinets)
    - Knows the current legal requirements concerning regulated substances used in the studio
    - Ensures that facilities and training for use of any material being ordered is adequate
    - Determines when a complaint of possible overexposure should be referred for medical evaluation.
    - Provides for the safety of visitors in the studio
    - Prepares procedures for dealing with accidents that may result in the unexpected exposure of personnel or the environment to a hazardous material

- Maintains the inventory of hazardous materials used under his or her supervision
- Oversees the handling of chemical waste pending proper disposal

5. **The Studio Worker** must be alert to and aware of the hazards of the materials with which he or she is working and
    - Maintain a thorough understanding of the DCSSP
    - Plan and conduct each operation in accordance with the DCSSP
    - Report all incidents, whether involving personnel, equipment, or facilities to their supervisor
6. **The Director of Facilities Services** has the responsibility for the continuous operation of the studio, including engineered safety devices, and:
    - Regularly tests (or contracts for services to test) and maintains safety showers, eyewashes, and ventilation systems.
    - Maintains negative pressure in designated work areas
    - Maintains fire extinguishers
    - Tests sprinklers, fire pump, and fire alarm system
    - Reviews construction, modification, and renovation plans for safety design
7. **The Director of Public Safety** has general responsibility for personal safety and:
    - Schedules and conducts fire drills and emergency and disaster drills
    - Responds to medical incidents of overexposure, provides treatment and assessment and determines the appropriate transportation
8. **The Safety Committee** assists the Director of Environmental Health and Safety in:
    - reviewing the Studio Safety Program
    - conducting safety audits
9. **All Employees of the College** are responsible for ensuring that they follow the procedures and faithfully implement the appropriate responsibilities put forth in the studio safety program. Failure to do so is a serious breach of college policy and subject to disciplinary action that might include termination of employment at the college. The procedures to be followed in the event of such action shall be in keeping with existing guidelines as stated in the appropriate handbook for faculty, administrators, or staff.

C. Availability

The Dickinson College Studio Safety Plan must be readily available to employees and employee representatives through their supervisor or the Director of Environmental Health & Safety.

D. Annual Review

The Dickinson College Studio Safety Plan will be reviewed at least annually from its effective date by the Director of Environmental Health & Safety.

II. Hazard Identification

A. Hazard Classes

Health hazards include chemicals which are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents which act on the hematopoietic systems, and agents which damage the lungs, skin, eyes, or mucous membranes.

Physical hazards includes chemicals for which there is scientifically valid evidence that they are combustible liquids, a compressed gas, explosive, flammable, an organic peroxide, an oxidizer, pyrophoric, unstable(reactive) or water reactive.

1. Toxic Hazard Criteria

A substance will be considered to present a toxic hazard when any one of the following criteria are met:

a. The MSDS or container label identifies or describes the substance as toxic.

b. The substance meets the definition of toxic in the Hazard Communication Standard (29 CFR 1910.1200 Appendix A):

i. The median lethal dose (LD_{50}) is more than 50 mg/kg of body weight but not more than 500 mg/kg of body weight when administered orally to albino rats weighing between 200 and 300 grams each; or

ii. The median lethal dose is more than 200 mg/kg of body weight but not more than 1000 mg/kg of body weight when administered by continuous contact for 24 hours (or less if death occurs within 24 hours) with the bare skin of albino rabbits weighing between two and three kilograms each; or

iii. The median lethal concentration (LC_{50}) in air is more than 200 ppm by volume of gas or vapor but not more than 2000 ppm by volume of gas or vapor, or more than two mg/L but not more than 20 mg/L of mist, fume, or dust, when administered by continuous inhalation for one hour (or less if death occurs within one hour) to albino rats weighing between 200 and 300 grams each.

c. Any substance whose toxic properties are unknown.

2. **Fire Hazard Criteria**

A substance will be considered to present a fire hazard when any one of the following criteria are met:

a. The MSDS or container label identifies or describes the substance as flammable or combustible.

b. The substance fits the definition of "combustible liquid" in the OSHA Hazcom Standard (29 CFR 1910.1200):

•Combustible liquid means any liquid having a flashpoint at or above 100 °F but below 200 °F, except any mixture having components with flashpoints of 200 °F, or higher, the total volume of which make up 99% or more of the total volume of the mixture.

c. The substance fits any of the following definitions of "flammable chemicals" in the OSHA Hazcom Standard (29 CFR 1910.1200):

- "Aerosol, flammable" means an aerosol that, when tested by the method described in 16 CFR 1500.45, yields a flame protection exceeding 18 inches at full valve opening, or a flashback (a flame extending back to the valve) at any degree of valve opening.
- "Gas, flammable" means a gas that, at ambient temperature and pressure, forms a flammable mixture with air at a concentration of 13% by volume or less; or a gas that, at ambient temperature and pressure, forms a range of flammable mixtures with air wider than 12% by volume, regardless of the lower limit.
- "Liquid, flammable" means any liquid having a flashpoint below 100 °F, except any mixture having components with flashpoints of 100 °C or higher, the total of which make up 99% or more of the total volume of the mixture.
- "Solid, flammable" means a solid, other than a blasting agent or explosive as defined in 29 CFR 1910.109(a), that is liable to cause fire through friction, absorption of moisture, spontaneous chemical change, or retained heat from manufacturing or processing, or which can be ignited readily and when ignited burns so vigorously and persistently as to create a serious hazard. A chemical shall be considered to be a flammable solid if, when tested by the method described in 16 CFR 1500.44, it ignites and burns

with a self-sustained flame at a rate greater than one-tenth of an inch per second along its major axis.

3. Reactivity Hazard Criteria

A substance will be considered to present a reactivity hazard when any one of the following criteria are met:

a. The MSDS or container label identifies or describes the substance as unstable, reactive, explosive, dangerous when wet, pyrophoric, an oxidizer, or an organic peroxide.

b. The substance fits the definition of unstable(reactive), explosive, organic peroxide, oxidizer, water reactive, or pyrophoric in the OSHA Hazcom Standard (29 CFR 1910.1200):

- Unstable (reactive) means a chemical which in the pure state, or as produced or transported, will vigorously polymerize, decompose, condense, or will become self-reactive under conditions of shock, pressure, or temperature.
- Explosive means a chemical that causes sudden, almost instantaneous release of pressure, gas, or heat when subjected to sudden shock, pressure, or high temperature.
- Organic peroxide means an organic compound that contains the bivalent –O—O— structure and which may be considered to be a structural derivative of hydrogen peroxide where one or both of the hydrogen atoms have been replaced by organic radicals.
- Oxidizer means a chemical other than a blasting agent or explosive as defined in 1910.109(a), that initiates or promotes combustion in other materials, thereby causing fire either of itself or through the release of oxygen or other gases.
- Water-reactive means a chemical that reacts with water to release a gas that is either flammable or presents a health hazard.
- Pyrophoric means a chemical that will ignite spontaneously in air at a temperature of 130 °F or below.

4. Corrosivity Hazard Criteria

A substance will be considered to present a corrosivity hazard when any one of the following criteria are met:

a. The MSDS or container label identifies or describes the substance as corrosive

b. The substance fits the OSHA definition of corrosive in the Hazard Communication Standard (29 CFR 1910.1200 Appendix A):

•Corrosive means a chemical that causes visible destruction of, or irreversible alterations in, living tissue by chemical action at the site of contact. For example, a chemical is considered corrosive if, when tested on the skin of albino rabbits by the method described by the U.S. Department of Transportation in Appendix A to 49 CFR part 173, it destroys or changes irreversibly the structure of the tissue at the site of contact following an exposure period of four hours. This term shall not refer to action on inanimate surfaces.

5. Contact Hazard Criteria

A substance will be considered to present a contact hazard when any one of the following criteria are met:

a. The MSDS or container label identifies or describes the substance as an allergen, irritant, or sensitizer.

b. The substance fits the OSHA definition of an "irritant" or "sensitizer" in the Hazard Communication Standard (29 CFR 1910.1200 Appendix A):

•Irritant means a chemical, which is not corrosive, but which causes a reversible inflammatory effect on living tissue by chemical action at the site of contact. A chemical is a skin irritant if, when tested on the intact skin of albino rabbits by the methods of 16 CFR 1500.41 for four hours exposure or by other appropriate techniques, it results in an empirical score of five or more. A chemical is an eye irritant if so determined under the procedure listed in 16 CFR 1500.42 or other appropriate techniques.

•Sensitizer means a chemical that causes a substantial proportion of exposed people or animals to develop an allergic reaction in normal tissue after repeated exposure to the chemical.

6. Particularly Hazardous Substance Criteria

A substance will be considered a particularly hazardous substance when any of the following criteria are met:

a. The MSDS or container label identifies or describes the substance as a carcinogen, reproductive toxin, or highly toxic.

b. The substance meets the definition of "highly toxic" in the Hazard Communication Standard (29 CFR 1910.1200):

- The median lethal dose (LD_{50}) is equal to or less than 50 mg/kg of body weight when administered orally to albino rats weighing between 200 and 300 grams each; or
- The median lethal dose is equal to or less than 200 mg/kg of body weight when administered by continuous contact for 24 hours (or less if death occurs within 24 hours) with the bare skin of albino rabbits weighing between two and three kilograms each; or
  The median lethal concentration (LC_{50}) in air is equal to or less than 200 ppm by volume or less of gas or vapor, or equal to or less than 2 mg/L of mist, fume, or dust, when administered by continuous inhalation for one hour (or less if death occurs within one hour) to albino rats weighing between 200 and 300 grams each; or

c. The substance meets the definition of a "carcinogen" in the Hazcom Standard (29 CFR 1910.1200):

- The substance is regulated by OSHA as a carcinogen, or
- It is listed as a carcinogen or potential carcinogen in the Annual Report on Carcinogens published by the National Toxicology Program (NTP) (latest edition), or
- It has been evaluated by the International Agency for Research on Cancer (IARC), and found to be a carcinogen or potential carcinogen

d. The substance fits the definition of "reproductive toxins" in the OSHA Hazcom Standard (29 CFR 1910.12000):

•Reproductive toxins means chemicals which affect the reproductive capabilities including chromosomal damage (mutations) and effects on fetuses (teratogenesis).

Use the MSDS to address chronic toxicity. For further help in determining the hazard of a chemical, contact your supervisor or the Director of Environmental Health & Safety.

7. Compressed Gas Hazard Criteria

A substance will be considered to present a compressed gas hazard when any of the following criteria are met:

a. The MSDS or container label identifies or describes the substance as a compressed gas.
b. The substance meets the definition of a "compressed gas" in the Hazcom Standard (29 CFR 1910.1200).

•Compressed gas means (i) a gas or mixture of gases having, in a container, an absolute pressure exceeding 40 psi at 70 °F; or (ii) a gas or mixture of gases having, in a container, an absolute pressure exceeding 104 psi at 130 °F regardless of the pressure at 70 °F; or (iii) a liquid having a vapor pressure exceeding 40 psi at 100 °F as determined by ASTM D-323-72.

B. Art Media Hazards

1. Sculpture

Stone, cement, plaster, clay, wax, resin-bonded sand, and plastics are commonly used to sculpt.

<u>Stone</u>

The primary hazard when working with stone is exposure to dust. Stones may contain significant amounts of asbestos, free silica, talc, or toxic metal impurities.

Other hazards include flying particles when stones are shaped, tool noise, and muscle injuries from lifting stones.

<u>Cement</u>

The primary hazard when working with cement is skin and respiratory irritation caused by the alkaline compounds in the media.

Other hazards include skin burns caused by contact with wet cement, and allergies to impurities in the cement dust.

<u>Plaster</u>

The primary hazard when working with plaster is eye and respiratory irritation caused by the media or additives in the media.

Other hazards include severe burns caused by heat in the setting reaction, when casting body parts in plaster; and exposure to toxic additives in the plaster (e.g. – silica sand).

Oven-Fired Clay

Oven-fired clays such as Sculpey® and Fimo®, contain vinyl chloride plastic and plasticizers. The primary hazard when working with oven-fired clays is exposure to the plasticizers. Some plasticizers are known carcinogens, while others have not been studied for their cancer causing effects. See plastics below for more information on these hazards.

Wax

The primary hazard when working with wax is respiratory irritation or illness caused by exposure to decomposition products when the wax is overheated. These include formaldehyde, acrolein, and acetaldehyde.

Another hazard is the risk of fire or explosion caused by wax fume forming above overheated wax.

Resin-Bonded Sand

The primary hazard when working with resin-bonded sand is exposure to the resins and catalysts that set them. In addition, toxic gases may be emitted when these compounds burn off during casting.

Plastics, Glues, and Adhesives

Plastics have become ubiquitous in our daily lives, and art materials are no exception. Plastics (including Glues and Adhesives) are created when a monomer reacts with similar monomers to form a polymer. Monomers are generally very toxic, although the polymer they form is usually nontoxic (e.g. – methyl methacrylate monomers and the Lucite® plastic it forms). Additionally, chemicals known as initiators that are used to cause monomers to form polymer plastics are often toxic or reactive.

Additonal toxic chemicals may be added to plastics to aid in their manufacturing, and to prevent their aging, discoloration, and hardening.

One class of chemical, organic peroxides, used to initiate polymerization reactions is extremely hazardous. Most organic peroxides are unstable (reactive) and may explode when subjected to heat or friction. The risk increases with age or when improperly stored.

Lastly, although most polymers are not toxic, they still contain toxic chemicals which can be released when they are cut or heated.

2. Painting and Drawing

Painting and drawing materials consist of pigments contained in vehicles such as wax, oil, water, and chemical solvents.

Pigments

The primary hazard when working with pigments is exposure to toxins and particularly hazardous substances, including: lead, cadmium, chrome, zinc, and cobalt. Pigments in painting and drawing materials are most dangerous when they are inhaled during mixing, sanding, spraying, and burning. Ingestion and absorption through the skin is much less hazardous and can be prevented using good hygiene practices.

Vehicles

Vehicles for pigments present a host of toxic hazards, many of which have not been well researched. The most hazardous vehicles contain volatile ingredients. Acrylic paints may contain small amounts of ammonia or formaldehyde which can be contact hazards.

Solvents

Solvents are liquid organic chemicals used to dissolve solid materials--they may be natural or synthetic. The primary hazards when working with solvents are toxicity, fire/explosion, and contact damage to skin.

3. Photography

The vast array of available photochemicals includes both health and physical hazards, including but not limited to: contact hazards, corrosivity hazards and toxicity hazards.

Additionaly, equipment such as enlargers create an electrical shock hazard.

4. Printmaking

Inks and Solvents

The hazards when working with inks and solvents are essentially the same as those when working with painting and drawing materials. This is logical given that the same pigments, vehicles, and solvents are often used for both processes.

Grounds

Resists and rosins applied to plates and heated contain various toxic solvents and decomposition products. Additionally, rosin dust may explode if a spark, flame, or static electricity is present.

Mordents

The primary hazard when working with mordents is corrosivity. Additionally, mordents may release flammable or toxic gases when reacting with metal plates (e.g. – nitric acid or dutch mordant).

5. Woodworking

Contact irritation and toxicity by inhalation are the primary hazards when working with wood and wood dust (this is especially true of dark and tropical woods such as walnut or rosewood). Fine wood dust may also explode if concentrated in the air.

Plywood and composition board is made by gluing sheets of wood, wood chips, or wood dust together. The glues used contain solvents which may be irritating or toxic by inhalation. Machining, heating, or burning plywood and composition board may release additional toxins.

Woodworking machines often produce hazardous levels of noise, contain rotating parts which can cause bodily injury, and require dangerous levels of electricity to operate.

Stripping, painting, and gluing wood involes the use of paints and solvents and presents hazards of toxicity, fire/explosion, and contact damage to skin.

6. Welding, Brazing, Soldering, and Casting

The primary hazards when welding, brazing, soldering, and casting are exposure to dangerous amounts of heat, light, and electricity.

Other hazards include the risk of fire and explosion, and exposure to toxic fumes or gases.

7. Ceramics

The primary hazards when working in the ceramic studio is exposure to toxic materials in clay and glazes, particularly during firing.

Other hazards include exposure to dangerous amounts of heat light, and electricity, and muscoskeletal disorders.

III. Control Methods

For studios using substances regulated by OSHA standards (29 CFR 1910, Subpart Z), supervisors must assure that employees' exposures do not exceed the Permissible Exposure Limits (PELs). The PELs represent Time Weighted Averages (TWA's) in parts per million (ppm) or milligrams of substance per cubic meter of air (mg/m^3). The TWA represents the ratio between exposure and work shift.

The American Conference of Governmental Industrial Hygienists (ACGIH) has established Threshold Limit Values (TLV's), which are TWA values similar to PEL's. The TLV's are in some cases lower than the PELs. To keep employee exposures as low as reasonably achievable, studios will be expected to uphold the lowest exposure limit, be it a PEL or a TLV.

Supervisors must contact the Director of Environmental Health & Safety to initiate employee exposure monitoring under the following circumstances:

1) Initial monitoring must be performed if there is reason to believe employee exposure levels routinely exceed the action level (or in the absence of an action level, the Permissible Exposure Limit (PEL).
2) Periodic monitoring must be performed when initial monitoring reveals an exposure over the action level (or in the absence of an action level, the PEL). The employer must comply with exposure monitoring provisions of the relevant standard.

Monitoring can be terminated in accordance with the relevant standard.

The Director of Environmental Health & Safety will notify the employee(s) of the monitoring results within 15 working days after receipt of monitoring results. The results must be either individually distributed in writing or posted in a location accessible to all affected employees.

The studio supervisor must implement control measures to reduce employee exposure to hazardous chemicals. The three types of control measures are:

A. Administrative Controls: methods of controlling employee exposures to contaminants by job rotation, work assignment or time periods away from contaminant.
B. Engineering Controls: methods of controlling employee exposures by modifying the source or reducing the quantity of contaminants released into the work environment..
C. Personal Protective Equipment: personal safety equipment designed for secondary employee protection from hazards.

NOTE: *E*ngineering controls and administrative controls shall first be determined and implemented when feasible. When such controls are not feasible to achieve full compliance, personal protective equipment or any other protective measures shall be used to keep the exposure of employees within the limits prescribed in the rule.

A. Administrative Controls

1. General Operating Procedures

a. General Safety Principles

The following guidelines have been established to minimize hazards and to maintain basic safety in the studio.

- Examine the hazards associated with the materials being used by carefully reading the label and reviewing the Material Safety Data Sheet.
- Know the location and proper use of emergency equipment (e.g. - fire alarms, fire extinguishers, emergency eyewash, and shower stations) and know the appropriate emergency response procedures.
- Use appropriate safeguards for each chemical in use, including personal protective equipment.
- Know the proper storage for chemicals when not in use.
- Use proper methods of transporting chemicals within the facility.
- Always be alert to unsafe conditions and actions and call attention to them so that corrective action can be taken.
- Avoid distracting or startling other workers when they are handling hazardous chemicals.
- Always inspect equipment for leaks, tears and other damage before handling a hazardous chemical. This includes fume hoods, gloves, goggles, etc.
- Use proper personal hygiene practices.

b. Health & Hygiene

The following practices have been established to protect employees from health risks associated with the inhalation, ingestion, injection, or absorption of hazardous chemicals:

- Avoid direct contact with any hazardous chemical. Know the types of protective equipment available and use the proper type for each job.
- Do not eat, drink, smoke, chew gum, or apply cosmetics in the studio.

- Confine long hair and loose clothing and always wear footwear that fully covers the feet.
- Wash thoroughly with soap and water after handling chemicals, before leaving the studio and before eating or drinking.
- Wash immediately if skin or eye contact is made with any chemical, regardless of corrosivity.
- Do not sit on work benches.
- Remove all personal protective equipment, including gloves and goggles, before leaving the studio.
- Change clothing as soon as possible after leaving the studio and launder work clothes often.

c. Food & Drink

The following statement is the accepted practice on food and drink in art studios and should be followed at all times:

“There shall be no food, drink, smoking or applying cosmetics in studios which have chemical hazards present. There shall be no storage, use or disposal of these 'consumable' items in studios. Rooms which are adjacent, but separated by floor to ceiling walls, and do not have any chemical hazards present, may be used for food consumption, preparation, or applying cosmetics at the discretion of the studio supervisor responsible for the areas”

d. Housekeeping

Sensible housekeeping practices contribute greatly towards safety. Use the following guidelines to maintain an orderly studio:

- Keep work areas clean and uncluttered with chemicals and equipment.
- Clean up work areas upon completion of an operation or at the end of each workday, including floors.
- Do not block exits or access to emergency equipment including safety showers, eyewashes, and fire extinguishers.
- Do not block hallways or stairs.
- Clean spills immediately and thoroughly, per the guidelines established in this document. Ensure a chemical spill kit is available and that employees know how to use it.
- Keep wastes in their proper containers and label them appropriately.
- Ensure hazardous chemicals are properly segregated into compatible categories and placed in an appropriate storage area
- Ensure all chemical containers are labeled with both the name of the chemical(s) and the hazards they present.

- Treat any unlabeled containers at the end of the workday as waste.
- Suspend all work in an affected studio when repairs or modifications of the facilities are being carried out, even if that work is being conducted outside of the studio setting.

e. Inventory

A complete list of hazardous chemicals used or stored in work areas must be attached to this document and maintained at that location. The identity of the hazardous chemicals must be that referenced on the appropriate material data safety sheets that are maintained at that location. The studio supervisor must update this inventory continuously.

Where employees must travel between workplaces during work shift, the written studio safety program and attached inventory list may be kept at the primary workplace facility.

f. Chemical Handling & Storage

The decision to use a hazardous chemical should be a commitment to handle and use the chemical properly from initial receipt to disposal.

- Information on proper handling, storage and disposal of hazardous chemicals and access to related Material Safety Data Sheets should be made available to all studio employees prior to the use of the chemical.
- Always purchase the minimum amount necessary to maintain operations. Conduct periodic inventories and discard unneeded items.
- Chemical containers with missing or defaced labels or that violate appropriate packaging regulations should not be accepted.
- Do not use food product containers. This prevents accidental ingestion of chemicals.
- Chemicals utilized in the studio must be appropriate for the studio's ventilation system.
- Chemicals should not be stored on high shelves and large bottles should be stored no more than two feet from floor level.
- Chemicals shall be segregated by compatibility. (See Appendix A)
- Chemical storage areas must be labeled as to their contents
- Storage of chemicals at the work bench or other work areas shall be kept to a minimum.
- Avoid exposure of chemicals to heat or direct sunlight.
- Ensure there is proper bonding and grounding when it is required, such as when transferring or dispensing a flammable liquid from a

large container or drum. Assure bonding and grounding is checked periodically.

- Cylinders with regulators must be individually secured. Only cylinders with valve protection caps securely in place may be safely gang-chained.
- When storing or moving a cylinder, have the valve protection cap securely in place to protect the stem.
- Cylinders must be secured in an upright position at all times. Use suitable racks, straps, chains, or stands to support cylinders against an immovable object, such as a bench or a wall, during use and storage.
- Use an appropriate cart to move cylinders.
- Oil or grease on the high-pressure side of an oxygen cylinder can cause an explosion. Do not lubricate an oxygen regulator or use a fuel gas regulator on an oxygen cylinder. Use an oxygen approved regulator.
- Any chemical mixture shall be assumed to be as toxic as its most toxic component.
- Substances of unknown toxicity shall be assumed to be toxic.

g. Working Alone

- Avoid working alone whenever possible.
- If you must work alone outside of normal working hours, the studio supervisor must be notified and the Department of Public Safety must be notified prior to commencing work, at regular intervals during work, and when completed with work.

h. Transporting of Chemicals

When transporting chemicals precautions should be taken to avoid dropping or spilling chemicals.

- Carry glass containers in specially designed bottle carriers or a leak resistant, unbreakable secondary container (e.g. – a five gallon plastic bucket).
- When transporting chemicals on a cart, use a cart that is suitable for the load and one that has high edges to contain leaks or spills.
- When possible, transport chemicals in freight elevators to avoid the possibility of exposing people on passenger elevators.

i. Close-Out Procedures

Whenever a studio worker leaves the College or is transferred to a different location, proper disposition of hazardous materials is required. This includes faculty, staff, and students.

The following procedures should be completed before the responsible individual leaves the College or transfers to a different location on campus:

- Assure that all containers of chemicals are labeled with the name of the chemical and all known hazards. All containers must be securely closed.
- Remove regulators from gas cylinders, replace cap, and return cylinders to the supplier. If cylinders are non-returnable, follow disposal procedures.
- Check fume hoods, storage cabinets, and bench tops for chemical containers and dispose of items used by the departing researcher. This includes facilities that are shared with other researchers.
- If chemicals are still usable, transfer the responsibility of the chemical to another worker who is willing to take charge of the chemical.
- Remove chemical contaminants from equipment and bench tops with an appropriate solvent or cleaning solution. Once contaminants have been eliminated, fill out an "Equipment Release Form" (located in Appendix B) and place it in a prominent position on the equipment or bench top.
- Label all hazardous waste and notify the Director of Environmental Health & Safety for pick up at least one week prior to vacating the studio.
- Notify the department when the studio(s) have been cleared.

j. Disposal of Hazardous Waste

For guidelines on the storage and disposal of hazardous wastes from studio operations contact the Director of Environmental Health & Safety at 245-1495 or 752-5219.

Chemical waste includes a wide range of materials including discarded chemical products and process wastes. Some chemicals are hazardous because they are specifically listed by the EPA, while others are not listed by the EPA but contain one or more of the EPA’s 4 hazardous characteristics: ignitability, corrosivity, reactivity, and toxicity. The following briefly describes the storage and disposal process for chemical waste:

Individual studios are responsible for the safe collection and storage of hazardous waste at their site. Satellite storage areas like this may accumulate as much as 55 gallons of hazardous waste (U-list) or one quart of acutely hazardous waste (P-list) in containers provided that the container is marked with an accumulation start date, the words "Hazardous Waste", and with the contents of the container identified. (See Appendix C)

NOTE: All constituents in concentrations >1% (>0.1% for particularly hazardous substances) must be identified.

Waste stored at the point of origin should be kept to a minimum. Containers should be closed and dated when they become full or within 180 days and moved to the hazardous waste holding area. Waste will be removed from the holding area at least every 180 days, generally during the mid-semester break and during the summer break.

No quantity of hazardous chemicals may be transported over public highways without proper packaging, classification, labeling, and documentation. Consequently, hazardous waste will be transported from the College for treatment or disposal only by licensed hazardous waste Transport, Storage, and Disposal facilities.

2. Media Specific Operating Procedures

a. Sculpture

When working with sculpting materials the following procedures shall be followed:

- provide adequate ventilation, including local exhaust ventilation
- wear appropriate PPE, including but not limited to: impact resistant safety goggles or chemical splash goggles, chemically resistant gloves, steel-toed shoes, NIOSH approved respirators with HEPA filters, hearing protection
- use proper bending/lifting techniques
- choose stones which do not contain asbestos (avoid serpentine, soapstone, and greenstone)
- choose stones with lower free silica contents (avoid sandstone, soapstone, and slate)
- review M.S.D.S. for all materials before beginning work; obtain mineral and chemical analysis if necessary
- use hand tools when possible to minimize dust generation
- when using hand tools carve or cut away from your body

- when using electric tools, ensure they are properly grounded
- when working on stones with high concentrations of silica, spray a fine water mist over the sculpture while carving to reduce dust generation
- when working with/near water, ensure tools and equipment are connected to a GFCI outlet.
- ensure proper housekeeping to keep dust levels in the air to a minimum; use dust collection systems whenever feasible.
- Do not dry sweep. Use a wet mop or vacuum with HEPA filter.
- do not cast body parts in plaster unless provisions have been made for dissipation of heat. Provide a barrier between the skin and casting material.
- do not overheat wax
- eliminate sparks, flames, and other ignition sources from wax heating area
- mix two-component resins only in the proportions recommended, differentiating between mixing by weight and mixing by volume—this ensures that the polymerization reaction will bind the hazardous chemicals into the plastic
- NEVER mix peroxides with acetone
- do not use urethane resins which contain isocyanates (e.g. – A-B foam®, Great Stuff®, Insta-Foam®, Insta-Pak®, Ureol systems®, Imron paints®, etc. . .)
- whenever possible, do not use resin systems containing organic peroxides
- label all organic peroxides with the date purchased and the date opened. Dispose of peroxide within 3 months after opening (or 6 months if unopened).
- store peroxides seperately from combustibles and away from heat or sunlight
- when working with finished plastics, use water or air-cooled tools whenever possible to keep decomposition to a minimum

b. Painting and Drawing

When working with painting and drawing materials the following procedures shall be followed:

- provide adequate ventilation, including local exhaust ventilation when necessary (e.g. – spraying or airbrushing; mixing powdered paints, pigments, and pastels)
- wear a NIOSH approved respirator when necessary (e.g. – fume hood or glove box not available)
- review M.S.D.S. for all materials before beginning work.

- do not use lead or carcinogenic pigments.
- choose water-based products over solvent-based products whenever possible
- if solvents must be used choose safer solvents (TLV of 300 ppm or greater), for example, choose odorless mineral spirits over turpentine.
- avoid mixing powdered pigments or dry pastels if possible; buy premixed paints whenever possible
- switch to oil pastels or similar non-dusty media whenever possible
- choose brushing and dipping techniques over spray methods whenever possible
- avoid sanding dry paints, or dusting techniques
- avoid skin contact by wearing gloves, especially when cleaning brushes with solvent
- wash with soap and water—NEVER wash skin with solvents
- NEVER point brushes with your lips
- Do not blow excess pastel dust or charcoal off drawings. Tap off the built up dust so it falls to the floor.
- Do not sweep. Use a wet mop or vacuum with HEPA filter.

c. Photography

When working in photography studios the following procedures shall be followed:

- Provide adequate dilution ventilation. Darkrooms require 0.5 cfm of outdoor air per square foot of floor area. Alternatively, 10—15 air changes per hour are sufficient under most conditions. Color processing requires more ventilation.
- Provide adequate local exhaust, per engineering requirements.
- cover all baths when not in use to prevent evaporation or release of toxic vapors and gases.
- Choose premixed chemicals over dry chemicals whenever possible.
- Mix chemicals under local exhaust ventilation (e.g. – a fume hood) or wear a NIOSH approved respirator.
- Purchase acetic acid in concentrations of 50% or less, whenever possible.
- Review M.S.D.S. for all photochemicals before beginning work.
- Do not use extremely toxic chemicals, such as those containing chromic acid, lead, mercury, uranium, or cyanide.
- wear appropriate PPE including: gloves, chemical splash goggles, aprons or lab coats

- ensure an emergency eyewash and safety shower are available when working with corrosive hazards
- Always add acid to water, never the reverse.
- Transfer prints from baths using tongs.
- Store photochemicals in their original container.
- Do not dispose of waste in the sink, unless authorized to do so by the Director of Environmental Health & Safety.
- separate electrical equipment (dry processes) from wet processes. Install GFCI on all darkroom outlets.
- avoid direct eye contact with all intense light sources (e.g. – carbon arc lighting)
- do not mix incompatible photochemicals (e.g. -- cyanides or sulfides with acid)

d. Printmaking

When working in printmaking studios the following procedures shall be followed:

- provide adequate ventilation, including dilution ventilation and local exhaust ventilation for acid baths and heating/burning processes
- review M.S.D.S. for all materials before beginning work
- choose water-based inks over solvent-based inks whenever possible
- wear appropriate PPE, including but not limited to: chemical splash goggles, gloves, aprons or lab coats
- Mix chemicals under local exhaust ventilation (e.g. – a fume hood) or wear a NIOSH approved respirator.
- construct rosin boxes with non-sparking materials and do not place boxes near flame, heat, or electrical sources
- Do not sweep. Use a wet mop or vacuum with HEPA filter.
- Do not dispose of waste in the sink, unless authorized to do so by the Director of Environmental Health & Safety.

e. Woodworking

When working in woodworking studios the following procedures shall be followed:

- avoid toxic or allergy-producing woods including woods treated with pentachlorophenol (PCP), chromated copper arsenate (CCA), or creosote; safer choices include woods treated with zinc or copper naphthenates or boron compounds.

- do not store large amounts of plywood or composition board in the shop since it will emit toxins into the air.
- provide adequate ventilation, including local exhaust ventilation (dust collection) on all woodworking machines
- ensure proper housekeeping to keep dust levels in the air to a minimum; floors should be kept free of sawdust and wood chips; vacuum around and inside machines to avoid fire hazards
- NEVER remove machine guards from tools and equipment
- flammable solvents in woodworking studios must be stored in approved flammables cabinets
- wear NIOSH approved hearing protection when operating noisy machinery
- review M.S.D.S for all wood, glue, solvent, or other hazardous materials before beginning work
- whenever possible, do not saw, sand, or otherwise machine plywoods, composition board, and woods treated with pesticides and preservatives; have the wood cut at the lumber yard if necessary
- do not burn plywood, composition board, and treated wood
- wear a NIOSH approved dust mask when dust cannot be controlled easily, such as during hand sanding
- Do not sweep. Use a vacuum with HEPA filter.
- do not wear clothing that could get caught in machinery; tie back loose hair
- choose water-based glues over solvent-based glues whenever possible.
- choose high boiling point paint strippers (e.g. dimethyl adipate) over low boiling point paint strippers (e.g. toluene) whenever possible; avoid paint strippers containing methylene chloride
- eliminate sources of ignition when working with solvents or solvent-based glues
- dispose of solvent-soaked rags in approved, self-closing waste disposal cans which are emptied each day.
- do not use torches or heat guns to remove paint

f. Welding, Brazing, Soldering, Casting

When welding, brazing, soldering, and casting the following procedures shall be followed:

- provide adequate ventilation, including dilution ventilation and local exhaust ventilation

- eliminate all combustible materials from the area or cover with fire proof tarps; combustible materials must be a minimum of 35 feet away.
- keep floors free of trip hazards
- do not work in wet conditions
- store all gas cylinders in an upright position
- cylinders without valve caps must be individually secured
- remove regulators and replace valve caps before moving cylinders
- a fire extinguisher must be immediately available
- a fire watch lasting 30 minutes after welding has been completed must occur
- review M.S.D.S. for all materials before beginning work (e.g. – compressed gases, welding or brazing rods, solders and brazing metals, casting metals and cast materials)
- do not weld metals or alloys which release highly toxic fumes (e.g. – beryllium, cadmium, antimony, arsenic); wear a NIOSH approved respirator if necessary
- do not use lead solder
- do not use fluoride fluxes
- choose a gun or electric iron for soldering over open-flame methods whenever possible
- wear appropriate PPE, including but not limited to: welding goggles and/or face shields, heat-resistant gloves and clothing,
- Do not sweep. Use a wet mop or vacuum with HEPA filter.
- choose foundry/casting sands over cold-setting resin bonded sand whenever possible
- choose safer mold-release agents which do not contain asbestos or silica flour

g. Ceramics

When working in ceramics studios the following procedures shall be followed:

- provide adequate ventilation, including dilution ventilation and local exhaust ventilation
- many clays (e.g. – ball clays) contain dioxins; choose clays which do not contain dioxins
- do not use glazes containing lead, cadmium, or uranium
- avoid prolonged repetitive motions (e.g. – wedging and throwing); take breaks frequently
- buy materials in 25 pound quantities or less whenever possible
- use proper bending/lifting techniques

- in addition to reviewing M.S.D.S for all materials before beginning work; obtain mineral and chemical analysis of clays and glazes from suppliers
- when applying glaze choose brushing and dipping methods over spraying, airbrushing, or dusting methods whenever possible
- wear appropriate PPE, including but not limited to: welding glasses, chemical and heat resistant gloves, NIOSH approved respirators
- when working with/near water, ensure tools and equipment are connected to a GFCI outlet (e.g. – potter's wheels)
- Do not sweep. Use a wet mop or vacuum with HEPA filter.

B. Engineering Controls

1. Safety Showers

Safety showers provide an immediate water drench of an affected person. Dickinson College will follow ANSI standard Z358.1-2004 for location, design and maintenance of safety showers:

- Showers shall be located within 25 feet of areas where chemicals with a pH of <= 2.0 or >= 12.5 are used.
- Showers shall be located within 100 feet of areas where chemicals with a pH of > 2 and < 4 or >= 9 and < 12.5 are used.
- The location of the shower should be clearly marked, well lighted and free from obstacles, closed doorways or turns.
- Showers shall provide the minimum of a 15 minute water supply at no less than 20 gallons per minute.
- Showers should be flushed out for five minutes at a time, once per week.

Maintenance staff shall test the flow through safety showers at least once annually.

2. Eye Wash Facilities

Dickinson College will follow ANSI standard Z358.1-2004 for location, design and maintenance of emergency eyewash facilities:

- An eyewash shall be located within 25 feet of areas where chemicals with a pH of <= 2.0 or >= 12.5 are used.
- An eyewash shall be located within 100 feet of areas where chemicals with a pH of > 2 and < 4 or >= 9 and < 12.5 are used.

- Those affected shall have both hands free to hold open the eye to ensure an effective wash behind the lids. This means providing eye wash facilities that are operated by a quick release system and simultaneously drench both eyes.
- Eye wash facilities shall provide the minimum of a 15 minute water supply at no less than 0.4 gallons per minute.
- Eye wash facilities should be flushed out for five minutes at a time, once per week.
- Spray heads shall be covered to protect against airborne contaminants.
- The location of the eyewash shall be clearly marked, well lighted and free from obstacles, closed doorways or turns.

Studio supervisors shall test eyewashes at least monthly. (A test consists of activating the eyewash for 15 minutes to flush the lines of corrosion and bacterial growth and permit observation of proper pressurization levels. Documentation consists of dating and initialing an attached tag.)

Maintenance staff shall test the flow through eyewashes at least once annually.

3. Ventilation Controls

Ventilation controls are those controls intended to minimize employee exposure to hazardous chemicals by removing air contaminants from the work site. There are two main types of ventilation controls:

General (Dilution) Exhaust: a room or building-wide system, which brings in air from outside and ventilates within. Studio air must be continually replaced, preventing the increase of air concentration of toxic substances during the workday. General exhaust systems are not recommended for the use of most hazardous chemicals.

Local Exhaust: a ventilated, enclosed workspace intended to capture, contain and exhaust harmful or dangerous fumes, vapors and particulate matter generated by procedures conducted with hazardous chemicals.

Ductless, or portable fume hoods, which employ filtration media, may be an option to conventional local exhaust hoods. Contact the Director of Environmental Health & Safety for consultation before acquiring any ductless fume hood.

a. Provisions for Local Exhaust Ventilation

To determine ventilation requirements, assess the MSDS. Some MSDS terminology, as listed below, may indicate a need for special ventilation considerations beyond general exhaust ventilation:

- *use with adequate ventilation*
- *avoid vapor inhalation*
- *use in a fume hood*
- *provide local exhaust ventilation*

Proper Use of Local Ventilation Systems**:** Once a local ventilation system is installed in a work area, it must be used properly to be effective. For use of hazardous chemicals warranting local ventilation controls, the following guidelines should be observed:

- Make certain that the hood you are using is appropriate for your work.
- Conduct all operations which may generate air contaminants at or above the appropriate PEL or TLV with local exhaust ventilation.
- Keep all apparatus at least 6 inches back from the face of the hood and keep the slots in the hood baffle free of obstruction by apparatus or containers. Large equipment should be elevated at least two inches off the base of the fume hood, to allow for the passage of air underneath the apparatus.
- Do not use the hood as a waste disposal mechanism.
- Keep extraneous chemicals or apparatus out of the hood, as they will create air flow disturbances. Only materials being used in an ongoing process should be kept in the fume hood.
- Keep paper and other light materials that might be drawn into the vent duct or fan out of the hood.
- Keep the hood sash completely closed at all times except when the hood is in use.
- Keep the hood on at all times when a chemical is inside the hood, regardless of whether any work is being done in the hood.
- Minimize foot traffic and other forms of potential air disturbances past the face of the hood.
- Do not have sources of ignition inside the hood when flammable liquids or gases are present.

- Use the sash as a safety shield when working with reactive chemicals.
- Make contingency plans in case of power failure or mechanical failure of the hood.
- Periodically check the airflow in the hood using a continuous monitoring device or another source of visible airflow indicator. If airflow has changed, contact the Director of Environmental Health & Safety to schedule an inspection or Department of Facilities Services for repair.

The system must be checked prior to each use to assure it is operating. **Never work with hazardous chemicals if the required ventilation system is not working**.

b. Fume Hood Testing and Repair

The college performs hood inspections annually. After an inspection, hoods are passed or failed for use based on the following criteria:

i. The face velocity of air being drawn into the hood at optimal sash height is measured quantitatively in feet per minute (fpm) by an anemometer. One measurement is taken per square foot of face space and averaged. Hoods must have an average face velocity of 80-120 fpm, depending on their design, with 100 fpm being the ideal average face velocity.

ii. If the exhaust system does not pass the face velocity test it will be posted as "failed" by the inspector. The studio supervisor must contact Facilities Services to have the system repaired before hazardous chemicals can be used in the hood.

If the exhaust system does pass, the inspector will post the date of inspection and will mark the hood to indicate proper sash position for optimum hood performance. The hood sash should be set at this point for procedures which could generate toxic aerosols, gases or vapors. In general, the sash height should be set at a level where the operator is shielded to some degree from any explosions or violent reactions which could occur and where optimum air flow dynamics are achieved. If a fume hood has no markings regarding sash height or inspection dates, please contact the

Director of Environmental Health & Safety to arrange an inspection.

4. Spill Kits

Ready access to a chemical spill kit is required in studios that work with hazardous chemicals. Minimally, such a kit should contain:

- splash resistant goggles
- chemical resistant gloves
- plastic bags
- multi-chemical absorbent (enough for 2 gallon spill)
- scoop

Most spills greater than 1 liter in volume require assistance from trained personnel.

Some absorbents are chemically specific. The best absorbents are those which can be used to clean up all types of chemical spills. Check absorbents in spill kits for their absorbency range.

Spill kits should be kept in a readily accessible location and each employee should be trained on how to use the spill kit.

C. Personal Protective Equipment

1. Eye Protection

Eye protection must be made available to all employees or visitors to studios where chemicals are used and stored. **The studio supervisor should establish the level of eye protection needed per activity.** American National Standards Institute (ANSI) recommends the following types of eye protection:

All eye protective devices must be stamped with "Z87" by the manufacturer if they meet ANSI standards. If the eye protection is not marked, it may not be the most effective protection available.

- Safety glasses with side shields offer minimal protection against flying fragments, chips, particles, sand and dirt. Safety glasses should be used only when working with solid materials. When a splash hazard exists, other protective eye equipment should be worn.
- Safety goggles (impact goggles) offer adequate protection against flying particles .

- Chemical splash goggles (acid goggles) have indirect venting for splash proof sides, which provide adequate protection against splashes. **Chemical splash goggles offer the best eye protection from chemical splashes. Impact goggles should not be worn when danger of a splash exists.**
- Face shields protect the face and neck from flying particles and splashes. Always wear additional appropriate eye protection under face shields. Ultra-violet light face shields should be worn when working over UV light sources.

2. Skin and Body Protection

Skin and body protection involves the use of protective clothing to protect individuals from exposure. Use the MSDS to determine clothing needed for the hazards being used, as protective garments are not equally effective for every hazard. (e.g. - some chemicals will permeate a garment in a very short time, whereas others will not)

The basic and most effective forms of protection are gloves and lab coats. A glove selection guide appears in Appendix D.

Avoid wearing open-toed shoes, sandals, shorts, etc. when working with hazardous chemicals. Even when there is minimal danger of skin contact with a particularly hazardous substance, lab coats, coveralls, aprons, or protective suits should be utilized. **These garments should not leave the work site.**

3. Hearing Protection

The two most common types of hearing protection devices used at Dickinson College are earplugs and earmuffs. Although these hearing protectors do not eliminate all noise reaching the ear, they are generally capable of reducing the noise exposure below the 8-hour time weighted average of 90 dBA.

Refer to the Dickinson College Hearing Conservation Program.

4. Respirators

Use of respirators is strongly discouraged. Where the use of respirators is necessary to maintain exposure below permissible exposure limits, a written respirator program is required in accordance 29 CFR 1910.134, and the employer shall provide, at no cost to the employee, the proper respiratory equipment.

Prior to using a respirator for the first time or for a new activity, employees must complete a respirator wearer questionnaire, receive a medical exam from a college approved physician, attend a respirator training session, and undergo a fit test.

For more information on respirator use, contact the Director of Environmental Health & Safety at 245-1495 or 752-5219.

IV. Employee Information & Training

A. Training

Employees must have access to information and training to ensure that they are apprised of the hazards in their work area. Such information must be provided at the time of an employee's initial assignment to a work area where hazards are present and prior to assignment involving new exposure situations. Employees should receive periodic refresher information and training to ensure that they are aware of the risks of exposure to hazards.

Method of Training.

General training will be provided by the Director of Environmental Health & Safety and may take the form of individual instruction, group seminars, audiovisual presentations, handout material, or any combination of the above. Site-specific training shall be provided by studio supervisors or an appropriate designee.

Training

General awareness training provided by the Director of Environmental Health & Safety to employees will include:

- Methods and observations that may be used to detect the presence of a hazard or release of a hazardous chemical (such as monitoring conducted by the employer, continuous monitoring devices, visual appearance or odor of hazardous chemicals when being released, etc.).
- General physical and health hazards in the work area
- The measures employees can take to protect themselves from these hazards, including specific procedures the college has implemented to protect employees from exposure to hazards, such as appropriate work practices, emergency procedures, and personal protective equipment to be used.
- The applicable details of the DCSSP.

Site-specific training provided by studio supervisors (or designees) to employees will include:

- Site-specific standard operating procedures.
- Specific physical and health hazards in the work area (chemical hazards are available on Material Safety Data Sheets).

Documentation

The Director of Environmental Health & Safety will document general awareness training required by the DCSSP. Site-specific training must be documented using the Site-Specific Training Checklist in Appendix E and maintained by the studio supervisor.

B. Signs

Warning signs should alert employees to potential hazards and allow those unfamiliar with the studio surroundings to identify hazardous chemical use and storage areas, safety facilities, emergency equipment, exits, and aid emergency response personnel.

C. Labels

All containers of hazardous chemicals must be labeled with the name of the chemical(s) and the hazard(s), if not provided by the manufacturer. If a chemical has more than one hazard, it must be labeled with both hazards. For example, acetaldehyde is both a flammable and a carcinogen, and must be labeled appropriately.

Anything available over the counter to the general public is exempt from labeling requirements if it has already been labeled by the manufacturer. This includes consumer products such as cans of spray paint or turpentine.

All peroxides must be labeled with the date received and opened. After the recommended disposal date, usually 3 months, the chemical shall be disposed of properly.

Portable containers into which hazardous chemicals are transferred from labeled containers, and which are intended only for the immediate use of the employee who performs the transfer, are exempt from labeling. Containers which are stored beyond the work shift or are transferred to a person other than the one who made the transfer are not portable containers.

Chemical manufacturers, importers, and distributors of hazardous chemicals are all required to provide appropriate labels and material safety data sheets to the employers to which they ship the chemicals. Dickinson College, as a “user” of the chemicals can rely on the information received from its suppliers and has no independent duty to re-label incoming containers; however, they must ensure that the labels have not been removed or defaced.

All hazardous chemical waste should be segregated and labeled. Upon initial waste collection, attach a "Hazardous Waste" label containing the accumulation start date.

D. Material Safety Data Sheets

A Material Safety Data Sheet (MSDS) is a document containing chemical hazard identification and safe handling information and is prepared in accordance with the OSHA Hazard Communication Standard.

Chemical manufacturers and importers must obtain or develop a material safety data sheet for each hazardous chemical they produce or import. An MSDS must be provided with their initial shipment, and with the first shipment after a material safety data sheet is updated.

Dickinson College, as a "user" of the chemicals can rely on the information received from its suppliers and has no independent duty to develop a material safety data sheet; however, each work area must have an MSDS for each hazardous chemical that is used. If a material safety data sheet is not provided with a shipment that has been labeled as a hazardous chemical, one must be obtained as soon as possible.

Material safety data sheets (MSDS) for each hazardous chemical must be readily accessible, in the work area, during each work shift to employees or their designated representatives. Electronic access, or other alternatives to paper copies of the MSDS are permitted as long as no barriers to immediate employee access are created by such options.

Where employees must travel between workplaces during work shift, the MSDS may be kept at the primary workplace facility. In this situation, the College must ensure that employees can immediately obtain the required information in an emergency.

If information from an MSDS is needed in case of an emergency, contact the Department of Public Safety at 245-1111.

V. Emergency/Medical Procedures

A. Fire

The following steps are basic protocol for handling a fire or fire-related emergency situation in the studio:

1. Pull the fire alarm.
2. Evacuate
3. Do NOT attempt to extinguish a fire unless you have first warned others and/or activated an alarm
4. Call 911 from a safe location.
5. Contact Public Safety at 245-1111.

A fire in a small vessel can usually be suffocated by covering the vessel. If the fire is burning over an area too large to be suffocated quickly (within 30 to 45 seconds) and simply, leave the firefighting to those who have been trained and equipped. If you have been trained in the use of fire extinguishers, fight the fire from a position from which you can escape, and only if you are confident that you will be successful. It is easy to underestimate a fire.

B. Non-Emergency Spill

If the spill is not an emergency and you have been trained in spill response, cleanup, and disposal and feel comfortable doing it, execute the following:

1. Locate the appropriate spill kit.
2. Choose the proper protective equipment:

    - Always wear gloves and protective eye wear
    - Use additional protective equipment such as an apron, coveralls, or boots as needed. Note: If you need a respirator, you do not have a non-emergency spill and should request outside assistance.

3. Confine or contain the spill.
4. Dispose of spilled materials and disposable personal protective equipment.
5. Restock spill kit and personal protective equipment.

For non-hazardous spills:

1. Cover liquid spills with spill kit absorbent and scoop into a plastic disposal bag.

2. Sweep solid materials into a dustpan and place in a sealed container.
3. Dispose of waste as normal trash as long as substance is non-volatile, non-hazardous.

For hazardous spills:

1. Cover liquid spills with spill kit absorbent and scoop into an appropriate disposal container (As a rule of thumb, the container should be of the same type that the chemical came from. For example, if the spill is from a chemical that was stored in glass bottle, the disposal container should be made of glass).
2. Wet mop dry substances to avoid spreading hazardous dust, provided it is non-water reactive.
3. If spilled chemical is a volatile solvent, transfer disposal bag to a hood for evaporation of solvent.
4. Contact the Director of Environmental Health & Safety for disposal instructions.

If there are questions about proper spill response techniques, call the Director of Environmental Health & Safety at 245-1495 or 752-5219.

C. Emergency Spill

If the spill creates an emergency, execute the following:

1. Pull the fire alarm
2. Call 911 from a safe location.
3. Contact Public Safety at 245-1111.
4. Isolate the spill area and close doors to the room where the spill occurred.
5. Remove ignition sources and shut down equipment.
6. Establish exhaust ventilation to the outside of the building only
7. Evacuate.

Attend to victims for a body splash**:**

1. Remove person(s) from spill area to fresh air only if attempts to rescue victim(s) does not present a danger to the rescuers.
2. Remove contaminated clothing while under an emergency shower.
3. Flood affected area with cold water for at least 15 minutes or longer if pain persists.

4. Wash skin with mild soap and water - do not use neutralizing chemicals, creams or lotions.
5. Contact emergency response personnel and assure they know the chemical(s) involved.
6. Contact Public Safety at 245-1111.

Attend to victims for an eye splash**:**

1. Remove victim(s) from spill area to fresh air only if attempts to rescue victim(s) does not present a danger to the rescuers.
2. Lead the victim(s) immediately to an emergency eye wash facility.
3. Hold eye lids open.
4. Flush eyes for at least 15 minutes or longer if pain persists.
5. Contact emergency response personnel and assure they know the chemical(s) involved.
6. Contact Public Safety at 245-1111.

D. Injury and Illness

For non-emergency medical treatment, under current Dickinson College policies and procedures, affected employees must seek care from a panel of approved providers. The approved provider list may be obtained by contacting the Office of Human Resources at 337-6202. For emergency treatment, go to the nearest facility and schedule a follow-up treatment with an approved provider. This can best be accomplished at:

Carlisle Regional Medical Center
Department of Emergency Medicine
45 Sprint Drive
Carlisle, PA 17325
717-249-1212

The studio supervisor must ensure the appropriate injury report forms are completed and a copy is returned to the Director of Environmental Health & Safety. See Appendix F for copies of the appropriate forms.

If you have any questions regarding injury and illness procedures, contact your studio supervisor or the Director of Environmental Health & Safety at 245-1495 or 752-5219.

VI. Record Keeping

A. Training Records

Records of all employees who attend the general awareness training will be maintained by the Director of Environmental Health & Safety for a period of at least one year after an employee leaves a position. Site-specific training records (Appendix E) should be retained within the division or department for at least one year after an employee leaves a position.

B. Employee Exposure and Medical Records

Employee exposure records (Appendix F) and medical records must be retained for at least 30 years in accordance with 29 CFR 1910.1020. Ideally exposure and medical records should be retained indefinitely.

C. Material Safety Data Sheets

Material Safety Data Sheets (MSDS) must be retained for a period of at least thirty years in accordance with 29 CFR 1910.1020. Ideally, MSDS should be retained indefinitely.

All records must be made available to employees or their designee's in accordance with 29 CFR 1910.1020

APPENDIX A

INCOMPATIBILITY OF CHEMICALS

When certain hazardous chemicals are stored or mixed together, violent reactions may occur because the chemicals are unsuitable for mixing, or are *incompatible*. Classes of incompatible chemicals should be segregated from each other during storage, according to hazard class. Use the following general guidelines for hazard class storage:

- Flammable/Combustible Liquids and Organic Acids
- Flammable Solids
- Mineral Acids
- Caustics
- Oxidizers
- Perchloric Acid
- Compressed Gases

Before mixing any chemicals, refer to this partial list, the chemicals' MSDS's or call the Director of Environmental Health & Safety to verify compatibility:

CHEMICAL	INCOMPATIBLE CHEMICAL(S)
Acetic acid	aldehyde, bases, carbonates, hydroxides, metals, oxidizers, peroxides, phosphates, xylene
Acetylene	halogens (chlorine, fluorine, etc.), mercury, potassium, oxidizers, silver
Acetone	acids, amines, oxidizers, plastics
Alkali and alkaline earth metals	acids, chromium, ethylene, halogens, hydrogen, mercury, nitrogen, oxidizers, plastics, sodium chloride, sulfur
Ammonia	acids, aldehydes, amides, halogens, heavy metals, oxidizers, plastics, sulfur
Ammonium nitrate	acids, alkalis, chloride salts, combustible materials, metals, organic materials, phosphorous, reducing agents, urea
Aniline	acids, aluminum, dibenzoyl peroxide, oxidizers, plastics
Azides	acids, heavy metals, oxidizers
Bromine	acetaldehyde, alcohols, alkalis, amines, combustible materials, ethylene, fluorine, hydrogen, ketones (acetone, carbonyls, etc.), metals, sulfur
Calcium oxide	acids, ethanol, fluorine, organic materials
Carbon (activated)	alkali metals, calcium hypochlorite, halogens, oxidizers

Carbon tetrachloride	benzoyl peroxide, ethylene, fluorine, metals, oxygen, plastics, silanes
Chlorates	powdered metals, sulfur, finely divided organic or combustible materials
Chromic acid	Acetone, alcohols, alkalis, ammonia, bases
Chromium trioxide	benzene, combustible materials, hydrocarbons, metals, organic materials, phosphorous, plastics
Chlorine	alcohol's, ammonia, benzene, combustible materials, flammable compounds (hydrazine), hydrocarbons (acetylene, ethylene, etc.), hydrogen peroxide, iodine, metals, nitrogen, oxygen, sodium hydroxide
Chlorine dioxide	hydrogen, mercury, organic materials, phosphorous, potassium hydroxide, sulfur
Copper	Calcium, hydrocarbons, oxidizers
Hydroperoxide	reducing agents
Cyanides	acids, alkaloids, aluminum, iodine, oxidizers, strong bases
Flammable liquids	ammonium nitrate, chromic acid, hydrogen peroxide, nitric acid, sodium peroxide, halogens
Fluorine	alcohol's, aldehydes, ammonia, combustible materials, halocarbons, halogens, hydrocarbons, ketones, metals, organic acids
Hydrocarbons (Such as butane, propane benzene, turpentine, etc.)	acids, bases, oxidizers, plastics
Hydrofluoric acid	metals, organic materials, plastics, silica (glass), (anhydrous) sodium
Hydrogen peroxide	acetylaldehyde, acetic acid, acetone, alcohol's carboxylic acid, combustible materials, metals, nitric acid, organic compounds, phosphorous, sulfuric acid, sodium, aniline
Hydrogen sulfide	Acetylaldehyde, metals, oxidizers, sodium
Hypochlorites	acids, activated carbon
Iodine	Acetylaldehyde, acetylene, ammonia, metals, sodium
Mercury	acetylene, aluminum, amines, ammonia, calcium, fulminic acid, lithium, oxidizers, sodium
Nitrates	acids, nitrites, metals, sulfur, sulfuric acid
Nitric acid	acetic acid, acetonitrile, alcohol's, amines, (concentrated) ammonia, aniline, bases, benzene, cumene, formic acid, ketones, metals, organic materials, plastics, sodium, toluene
Oxalic acid	oxidizers, silver, sodium chlorite

Oxygen	acetaldehyde, secondary alcohol's, alkalis and alkalines, ammonia, carbon monoxide, combustible materials, ethers, flammable materials, hydrocarbons, metals, phosphorous, polymers
Perchloric acid	acetic acid, alcohols, aniline, combustible materials, dehydrating agents, ethyl benzene, hydriodic acid, hydrochloric acid, iodides, ketones, organic material, oxidizers, pyridine
Peroxides, organic	acids (organic or mineral)
Phosphorus (white)	Oxygen (pure and in air), alkalis
Potassium	Acetylene, acids, alcohols, halogens, hydrazine, mercury, oxidizers, selenium, sulfur
Potassium chlorate	acids, ammonia, combustible materials, fluorine, hydrocarbons, metals, organic materials, sugars
Potassium perchlorate (also see chlorates)	alcohols, combustible materials, fluorine, hydrazine, metals, organic matter, reducing agents, sulfuric acid
Potassium permanganate	benzaldehyde, ethylene glycol, glycerol, sulfuric acid
Silver	Acetylene, ammonia, oxidizers, ozonides, peroxyformic acid
Sodium	acids, hydrazine, metals, oxidizers, water
Sodium nitrate	acetic anhydride, acids, metals, organic matter, peroxyformic acid, reducing agents
Sodium peroxide	acetic acid, benzene, hydrogen sulfide metals, oxidizers, peroxyformic acid, phosphorous, reducers, sugars, water
Sulfides	Acids
Sulfuric acid	Potassium chlorates, potassium perchlorate, potassium permanganate

References:

Material Safety Data Sheets, various chemical companies.

Appendix B

EQUIPMENT RELEASE FORM

Date: _____ Location of Origin_____
Studio Supervisor
_____
Destination/Service Department
_____
Service To Be Performed
_____
_____
Type of Equipment
_____
_____
_____
Contaminated (Yes/No)_____
Contaminants Identified/Suspected
_____
_____
_____
Method of Decontamination
_____
_____
_____
_____
Name of Person Decontaminating
_____

I certify that the above listed equipment is free of contamination or hazardous agents, and that it is safe to release to unrestricted areas and/or perform the work described above on this equipment. _____

Signature of Responsible Person

Appendix C

EPA U List

The primary hazardous properties of these materials have been indicated by the letters T (Toxicity), R (Reactivity), I (Ignitability) and C (Corrosivity). Absence of a letter indicates that the compound is only listed for toxicity.

These wastes and their corresponding EPA Hazardous Waste Numbers are:

Hazardous waste No.	Chemical abstracts No.	Substance
U394	30558-43-1	A2213.
U001	75-07-0	Acetaldehyde (I)
U034	75-87-6	Acetaldehyde, trichloro-
U187	62-44-2	Acetamide, N-(4-ethoxyphenyl)-
U005	53-96-3	Acetamide, N-9H-fluoren-2-yl-
U240	\1\ 94-75-7	Acetic acid, (2,4-dichlorophenoxy)-, salts & esters
U112	141-78-6	Acetic acid ethyl ester (I)
U144	301-04-2	Acetic acid, lead(2+) salt
U214	563-68-8	Acetic acid, thallium(1+) salt
see F027	93-76-5	Acetic acid, (2,4,5-trichlorophenoxy)-
U002	67-64-1	Acetone (I)
U003	75-05-8	Acetonitrile (I,T)
U004	98-86-2	Acetophenone
U005	53-96-3	2-Acetylaminofluorene
U006	75-36-5	Acetyl chloride (C,R,T)
U007	79-06-1	Acrylamide
U008	79-10-7	Acrylic acid (I)
U009	107-13-1	Acrylonitrile
U011	61-82-5	Amitrole
U012	62-53-3	Aniline (I,T)
U136	75-60-5	Arsinic acid, dimethyl-
U014	492-80-8	Auramine
U015	115-02-6	Azaserine
U010	50-07-7	Azirino[2[prime],3[prime]:3,4]pyrrolo[1,2-a]indole-4,7-dione, 6-amino-8-[[(aminocarbonyl)oxy]methyl]-1,1a,2,8,8a,8b-hexahydro-8a-methoxy-5-methyl-, [1aS(1aalpha,8beta,8aalpha,8balpha)]-

U280	101-27-9	Barban.
U278	22781-23-3	Bendiocarb.
U364	22961-82-6	Bendiocarb phenol.
U271	17804-35-2	Benomyl.
U157	56-49-5	Benz[j]aceanthrylene, 1,2-dihydro-3-methyl-
U016	225-51-4	Benz[c]acridine
U017	98-87-3	Benzal chloride
U192	23950-58-5	Benzamide, 3,5-dichloro-N-(1,1-dimethyl-2-propynyl)-
U018	56-55-3	Benz[a]anthracene
U094	57-97-6	Benz[a]anthracene, 7,12-dimethyl-
U012	62-53-3	Benzenamine (I,T)
U014	492-80-8	Benzenamine, 4,4[prime]-carbonimidoylbis[N,N-dimethyl-
U049	3165-93-3	Benzenamine, 4-chloro-2-methyl-, hydrochloride
U093	60-11-7	Benzenamine, N,N-dimethyl-4-(phenylazo)-
U328	95-53-4	Benzenamine, 2-methyl-
U353	106-49-0	Benzenamine, 4-methyl-
U158	101-14-4	Benzenamine, 4,4[prime]-methylenebis[2-chloro-
U222	636-21-5	Benzenamine, 2-methyl-, hydrochloride
U181	99-55-8	Benzenamine, 2-methyl-5-nitro-
U019	71-43-2	Benzene (I,T)
U038	510-15-6	Benzeneacetic acid, 4-chloro-alpha -(4-chlorophenyl)-alpha-hydroxy-, ethyl ester
U030	101-55-3	Benzene, 1-bromo-4-phenoxy-
U035	305-03-3	Benzenebutanoic acid, 4-[bis(2-chloroethyl)amino]-
U037	108-90-7	Benzene, chloro-
U221	25376-45-8	Benzenediamine, ar-methyl-
U028	117-81-7	1,2-Benzenedicarboxylic acid, bis(2-ethylhexyl) ester
U069	84-74-2	1,2-Benzenedicarboxylic acid, dibutyl ester
U088	84-66-2	1,2-Benzenedicarboxylic acid, diethyl ester
U102	131-11-3	1,2-Benzenedicarboxylic acid, dimethyl ester
U107	117-84-0	1,2-Benzenedicarboxylic acid, dioctyl ester
U070	95-50-1	Benzene, 1,2-dichloro-
U071	541-73-1	Benzene, 1,3-dichloro-
U072	106-46-7	Benzene, 1,4-dichloro-
U060	72-54-8	Benzene, 1,1[prime]-(2,2-dichloroethylidene)bis[4-chloro-
U017	98-87-3	Benzene, (dichloromethyl)-
U223	26471-62-5	Benzene, 1,3-diisocyanatomethyl-(R,T)
U239	1330-20-7	Benzene, dimethyl- (I,T)
U201	108-46-3	1,3-Benzenediol
U127	118-74-1	Benzene, hexachloro-
U056	110-82-7	Benzene, hexahydro- (I)
U220	108-88-3	Benzene, methyl-
U105	121-14-2	Benzene, 1-methyl-2,4-dinitro-

U106	606-20-2	Benzene, 2-methyl-1,3-dinitro-
U055	98-82-8	Benzene, (1-methylethyl)- (I)
U169	98-95-3	Benzene, nitro-
U183	608-93-5	Benzene, pentachloro-
U185	82-68-8	Benzene, pentachloronitro-
U020	98-09-9	Benzenesulfonic acid chloride (C,R)
U020	98-09-9	Benzenesulfonyl chloride (C,R)
U207	95-94-3	Benzene, 1,2,4,5-tetrachloro-
U061	50-29-3	Benzene, 1,1[prime]-(2,2,2-trichloroethylidene)bis[4-chloro-
U247	72-43-5	Benzene, 1,1[prime]-(2,2,2-trichloroethylidene)bis[4- methoxy-
U023	98-07-7	Benzene, (trichloromethyl)-
U234	99-35-4	Benzene, 1,3,5-trinitro-
U021	92-87-5	Benzidine
U202	\1\ 81-07-2	1,2-Benzisothiazol-3(2H)-one, 1,1-dioxide, & salts
U278	22781-23-3	1,3-Benzodioxol-4-ol, 2,2-dimethyl-, methyl carbamate.
U364	22961-82-6	1,3-Benzodioxol-4-ol, 2,2-dimethyl-,
U203	94-59-7	1,3-Benzodioxole, 5-(2-propenyl)-
U141	120-58-1	1,3-Benzodioxole, 5-(1-propenyl)-
U367	1563-38-8	7-Benzofuranol, 2,3-dihydro-2,2-dimethyl-
U090	94-58-6	1,3-Benzodioxole, 5-propyl-
U064	189-55-9	Benzo[rst]pentaphene
U248	\1\81-81-2	2H-1-Benzopyran-2-one, 4-hydroxy-3 -(3-oxo-1-phenyl-butyl)-, & salts, when present at concentrations of 0.3% or less
U022	50-32-8	Benzo[a]pyrene
U197	106-51-4	p-Benzoquinone
U023	98-07-7	Benzotrichloride (C,R,T)
U085	1464-53-5	2,2[prime]-Bioxirane
U021	92-87-5	[1,1[prime]-Biphenyl]-4,4[prime]-diamine
U073	91-94-1	[1,1[prime]-Biphenyl]-4,4[prime]-diamine, 3,3[prime]-dichloro-
U091	119-90-4	[1,1[prime]-Biphenyl]-4,4[prime]-diamine, 3,3[prime]-dimethoxy-
U095	119-93-7	[1,1[prime]-Biphenyl]-4,4[prime]-diamine, 3,3[prime]-dimethyl-
U225	75-25-2	Bromoform
U030	101-55-3	4-Bromophenyl phenyl ether
U128	87-68-3	1,3-Butadiene, 1,1,2,3,4,4-hexachloro-
U172	924-16-3	1-Butanamine, N-butyl-N-nitroso-
U031	71-36-3	1-Butanol (I)
U159	78-93-3	2-Butanone (I,T)
U160	1338-23-4	2-Butanone, peroxide (R,T)
U053	4170-30-3	2-Butenal
U074	764-41-0	2-Butene, 1,4-dichloro- (I,T)
U143	303-34-4	2-Butenoic acid, 2-methyl-, 7-[[2,3-dihydroxy-2-(1-methoxyethyl)-3-methyl-1-oxobutoxy]methyl]-2,3,5,7a-tetrahydro-1H-pyrrolizin-1-

		yl ester, [1S-[1alpha(Z),7(2S*,3R*),7aalpha]]-
U031	71-36-3	n-Butyl alcohol (I)
U136	75-60-5	Cacodylic acid
U032	13765-19-0	Calcium chromate
U372	10605-21-7	Carbamic acid, 1H-benzimidazol-2-yl, methyl ester.
U271	17804-35-2	Carbamic acid, [1-[(butylamino)carbonyl]-1H-benzimidazol-2-yl]-, methyl ester.
U280	101-27-9	Carbamic acid, (3-chlorophenyl)-, 4-chloro-2-butynyl ester.
U238	51-79-6	Carbamic acid, ethyl ester
U178	615-53-2	Carbamic acid, methylnitroso-, ethyl ester
U373	122-42-9	Carbamic acid, phenyl-, 1-methylethyl ester.
U409	23564-05-8	Carbamic acid, [1,2-phenylenebis (iminocarbonothioyl)]bis-, dimethyl ester.
U097	79-44-7	Carbamic chloride, dimethyl-
U389	2303-17-5	Carbamothioic acid, bis(1-methylethyl)-, S-(2,3,3-trichloro-2-propenyl)ester.
U387	52888-80-9	Carbamothioic acid, dipropyl-, S-(phenylmethyl) ester.
U114	\1\ 111-54-6	Carbamodithioic acid, 1,2-ethanediylbis-, salts & esters
U062	2303-16-4	Carbamothioic acid, bis(1-methylethyl)-, S-(2,3-dichloro-2-propenyl) ester
U279	63-25-2	Carbaryl.
U372	10605-21-7	Carbendazim.
U367	1563-38-8	Carbofuran phenol.
U215	6533-73-9	Carbonic acid, dithallium(1+) salt
U033	353-50-4	Carbonic difluoride
U156	79-22-1	Carbonochloridic acid, methyl ester (I,T)
U033	353-50-4	Carbon oxyfluoride (R,T)
U211	56-23-5	Carbon tetrachloride
U034	75-87-6	Chloral
U035	305-03-3	Chlorambucil
U036	57-74-9	Chlordane, alpha & gamma isomers
U026	494-03-1	Chlornaphazin
U037	108-90-7	Chlorobenzene
U038	510-15-6	Chlorobenzilate
U039	59-50-7	p-Chloro-m-cresol
U042	110-75-8	2-Chloroethyl vinyl ether
U044	67-66-3	Chloroform
U046	107-30-2	Chloromethyl methyl ether
U047	91-58-7	beta-Chloronaphthalene
U048	95-57-8	o-Chlorophenol
U049	3165-93-3	4-Chloro-o-toluidine, hydrochloride
U032	13765-19-0	Chromic acid H[INF]2[/INF] CrO[INF]4[/INF], calcium salt
U050	218-01-9	Chrysene

U051	.....	Creosote
U052	1319-77-3	Cresol (Cresylic acid)
U053	4170-30-3	Crotonaldehyde
U055	98-82-8	Cumene (I)
U246	506-68-3	Cyanogen bromide (CN)Br
U197	106-51-4	2,5-Cyclohexadiene-1,4-dione
U056	110-82-7	Cyclohexane (I)
U129	58-89-9	Cyclohexane, 1,2,3,4,5,6-hexachloro-, (1alpha,2alpha,3beta,4alpha ,5alpha,6beta)-
U057	108-94-1	Cyclohexanone (I)
U130	77-47-4	1,3-Cyclopentadiene, 1,2,3,4,5,5- hexachloro-
U058	50-18-0	Cyclophosphamide
U240	\1\ 94-75-7	2,4-D, salts & esters
U059	20830-81-3	Daunomycin
U060	72-54-8	DDD
U061	50-29-3	DDT
U062	2303-16-4	Diallate
U063	53-70-3	Dibenz[a,h]anthracene
U064	189-55-9	Dibenzo[a,i]pyrene
U066	96-12-8	1,2-Dibromo-3-chloropropane
U069	84-74-2	Dibutyl phthalate
U070	95-50-1	o-Dichlorobenzene
U071	541-73-1	m-Dichlorobenzene
U072	106-46-7	p-Dichlorobenzene
U073	91-94-1	3,3[prime]-Dichlorobenzidine
U074	764-41-0	1,4-Dichloro-2-butene (I,T)
U075	75-71-8	Dichlorodifluoromethane
U078	75-35-4	1,1-Dichloroethylene
U079	156-60-5	1,2-Dichloroethylene
U025	111-44-4	Dichloroethyl ether
U027	108-60-1	Dichloroisopropyl ether
U024	111-91-1	Dichloromethoxy ethane
U081	120-83-2	2,4-Dichlorophenol
U082	87-65-0	2,6-Dichlorophenol
U084	542-75-6	1,3-Dichloropropene
U085	1464-53-5	1,2:3,4-Diepoxybutane (I,T)
U108	123-91-1	1,4-Diethyleneoxide
U028	117-81-7	Diethylhexyl phthalate
U395	5952-26-1	Diethylene glycol, dicarbamate.
U086	1615-80-1	N,N[prime]-Diethylhydrazine
U087	3288-58-2	O,O-Diethyl S-methyl dithiophosphate
U088	84-66-2	Diethyl phthalate
U089	56-53-1	Diethylstilbesterol
U090	94-58-6	Dihydrosafrole
U091	119-90-4	3,3[prime]-Dimethoxybenzidine
U092	124-40-3	Dimethylamine (I)
U093	60-11-7	p-Dimethylaminoazobenzene
U094	57-97-6	7,12-Dimethylbenz[a]anthracene
U095	119-93-7	3,3[prime]-Dimethylbenzidine
U096	80-15-9	alpha,alpha- Dimethylbenzylhydroperoxide (R)
U097	79-44-7	Dimethylcarbamoyl chloride
U098	57-14-7	1,1-Dimethylhydrazine
U099	540-73-8	1,2-Dimethylhydrazine
U101	105-67-9	2,4-Dimethylphenol

U102	131-11-3	Dimethyl phthalate
U103	77-78-1	Dimethyl sulfate
U105	121-14-2	2,4-Dinitrotoluene
U106	606-20-2	2,6-Dinitrotoluene
U107	117-84-0	Di-n-octyl phthalate
U108	123-91-1	1,4-Dioxane
U109	122-66-7	1,2-Diphenylhydrazine
U110	142-84-7	Dipropylamine (I)
U111	621-64-7	Di-n-propylnitrosamine
U041	106-89-8	Epichlorohydrin
U001	75-07-0	Ethanal (I)
U404	121-44-8	Ethanamine, N,N-diethyl-
U174	55-18-5	Ethanamine, N-ethyl-N-nitroso-
U155	91-80-5	1,2-Ethanediamine, N,N-dimethyl-N[prime]-2-pyridinyl-N[prime]-(2-thienylmethyl)-
U067	106-93-4	Ethane, 1,2-dibromo-
U076	75-34-3	Ethane, 1,1-dichloro-
U077	107-06-2	Ethane, 1,2-dichloro-
U131	67-72-1	Ethane, hexachloro-
U024	111-91-1	Ethane, 1,1[prime]-[methylenebis(oxy)]bis[2-chloro-
U117	60-29-7	Ethane, 1,1[prime]-oxybis-(I)
U025	111-44-4	Ethane, 1,1[prime]-oxybis[2-chloro-
U184	76-01-7	Ethane, pentachloro-
U208	630-20-6	Ethane, 1,1,1,2-tetrachloro-
U209	79-34-5	Ethane, 1,1,2,2-tetrachloro-
U218	62-55-5	Ethanethioamide
U226	71-55-6	Ethane, 1,1,1-trichloro-
U227	79-00-5	Ethane, 1,1,2-trichloro-
U410	59669-26-0	Ethanimidothioic acid, N,N'-[thiobis[(methylimino) carbonyloxy]]bis-, dimethyl ester
U394	30558-43-1	Ethanimidothioic acid, 2-(dimethylamino)-N-hydroxy-2-oxo-, methyl ester.
U359	110-80-5	Ethanol, 2-ethoxy-
U173	1116-54-7	Ethanol, 2,2[prime]-(nitrosoimino)bis-
U395	5952-26-1	Ethanol, 2,2[prime]-oxybis-, dicarbamate.
U004	98-86-2	Ethanone, 1-phenyl-
U043	75-01-4	Ethene, chloro-
U042	110-75-8	Ethene, (2-chloroethoxy)-
U078	75-35-4	Ethene, 1,1-dichloro-
U079	156-60-5	Ethene, 1,2-dichloro-, (E)-
U210	127-18-4	Ethene, tetrachloro-
U228	79-01-6	Ethene, trichloro-
U112	141-78-6	Ethyl acetate (I)
U113	140-88-5	Ethyl acrylate (I)
U238	51-79-6	Ethyl carbamate (urethane)
U117	60-29-7	Ethyl ether (I)
U114	\1\ 111-54-6	Ethylenebisdithiocarbamic acid, salts & esters
U067	106-93-4	Ethylene dibromide
U077	107-06-2	Ethylene dichloride
U359	110-80-5	Ethylene glycol monoethyl ether

U115	75-21-8	Ethylene oxide (I,T)
U116	96-45-7	Ethylenethiourea
U076	75-34-3	Ethylidene dichloride
U118	97-63-2	Ethyl methacrylate
U119	62-50-0	Ethyl methanesulfonate
U120	206-44-0	Fluoranthene
U122	50-00-0	Formaldehyde
U123	64-18-6	Formic acid (C,T)
U124	110-00-9	Furan (I)
U125	98-01-1	2-Furancarboxaldehyde (I)
U147	108-31-6	2,5-Furandione
U213	109-99-9	Furan, tetrahydro-(I)
U125	98-01-1	Furfural (I)
U124	110-00-9	Furfuran (I)
U206	18883-66-4	Glucopyranose, 2-deoxy-2-(3-methyl-3-nitrosoureido)-, D-
U206	18883-66-4	D-Glucose, 2-deoxy-2-[[(methylnitrosoamino)-carbonyl]amino]-
U126	765-34-4	Glycidylaldehyde
U163	70-25-7	Guanidine, N-methyl-N[prime]-nitro-N-nitroso-
U127	118-74-1	Hexachlorobenzene
U128	87-68-3	Hexachlorobutadiene
U130	77-47-4	Hexachlorocyclopentadiene
U131	67-72-1	Hexachloroethane
U132	70-30-4	Hexachlorophene
U243	1888-71-7	Hexachloropropene
U133	302-01-2	Hydrazine (R,T)
U086	1615-80-1	Hydrazine, 1,2-diethyl-
U098	57-14-7	Hydrazine, 1,1-dimethyl-
U099	540-73-8	Hydrazine, 1,2-dimethyl-
U109	122-66-7	Hydrazine, 1,2-diphenyl-
U134	7664-39-3	Hydrofluoric acid (C,T)
U134	7664-39-3	Hydrogen fluoride (C,T)
U135	7783-06-4	Hydrogen sulfide
U135	7783-06-4	Hydrogen sulfide H[INF]2[/INF] S
U096	80-15-9	Hydroperoxide, 1-methyl-1-phenylethyl-(R)
U116	96-45-7	2-Imidazolidinethione
U137	193-39-5	Indeno[1,2,3-cd]pyrene
U190	85-44-9	1,3-Isobenzofurandione
U140	78-83-1	Isobutyl alcohol (I,T)
U141	120-58-1	Isosafrole
U142	143-50-0	Kepone
U143	303-34-4	Lasiocarpine
U144	301-04-2	Lead acetate
U146	1335-32-6	Lead, bis(acetato-O)tetrahydroxytri-
U145	7446-27-7	Lead phosphate
U146	1335-32-6	Lead subacetate
U129	58-89-9	Lindane
U163	70-25-7	MNNG
U147	108-31-6	Maleic anhydride
U148	123-33-1	Maleic hydrazide
U149	109-77-3	Malononitrile
U150	148-82-3	Melphalan
U151	7439-97-6	Mercury

U152	126-98-7	Methacrylonitrile (I, T)
U092	124-40-3	Methanamine, N-methyl- (I)
U029	74-83-9	Methane, bromo-
U045	74-87-3	Methane, chloro- (I, T)
U046	107-30-2	Methane, chloromethoxy-
U068	74-95-3	Methane, dibromo-
U080	75-09-2	Methane, dichloro-
U075	75-71-8	Methane, dichlorodifluoro-
U138	74-88-4	Methane, iodo-
U119	62-50-0	Methanesulfonic acid, ethyl ester
U211	56-23-5	Methane, tetrachloro-
U153	74-93-1	Methanethiol (I, T)
U225	75-25-2	Methane, tribromo-
U044	67-66-3	Methane, trichloro-
U121	75-69-4	Methane, trichlorofluoro-
U036	57-74-9	4,7-Methano-1H-indene, 1,2,4,5,6,7,8,8-octachloro-2,3,3a,4,7,7a-hexahydro-
U154	67-56-1	Methanol (I)
U155	91-80-5	Methapyrilene
U142	143-50-0	1,3,4-Metheno-2H-cyclobuta[cd]pentalen-2-one, 1,1a,3,3a,4,5,5,5a,5b,6-decachlorooctahydro-
U247	72-43-5	Methoxychlor
U154	67-56-1	Methyl alcohol (I)
U029	74-83-9	Methyl bromide
U186	504-60-9	1-Methylbutadiene (I)
U045	74-87-3	Methyl chloride (I,T)
U156	79-22-1	Methyl chlorocarbonate (I,T)
U226	71-55-6	Methyl chloroform
U157	56-49-5	3-Methylcholanthrene
U158	101-14-4	4,4[prime]-Methylenebis(2-chloroaniline)
U068	74-95-3	Methylene bromide
U080	75-09-2	Methylene chloride
U159	78-93-3	Methyl ethyl ketone (MEK) (I,T)
U160	1338-23-4	Methyl ethyl ketone peroxide (R,T)
U138	74-88-4	Methyl iodide
U161	108-10-1	Methyl isobutyl ketone (I)
U162	80-62-6	Methyl methacrylate (I,T)
U161	108-10-1	4-Methyl-2-pentanone (I)
U164	56-04-2	Methylthiouracil
U010	50-07-7	Mitomycin C
U059	20830-81-3	5,12-Naphthacenedione, 8-acetyl-10-[(3-amino-2,3,6-trideoxy)-alpha-L-lyxo-hexopyranosyl)oxy]-7,8,9,10-tetrahydro-6,8,11-trihydroxy-1-methoxy-, (8S-cis)-
U167	134-32-7	1-Naphthalenamine
U168	91-59-8	2-Naphthalenamine
U026	494-03-1	Naphthalenamine, N,N[prime]-bis(2-chloroethyl)-
U165	91-20-3	Naphthalene
U047	91-58-7	Naphthalene, 2-chloro-
U166	130-15-4	1,4-Naphthalenedione
U236	72-57-1	2,7-Naphthalenedisulfonic acid,

			3,3[prime]-[(3,3[prime]-dimethyl[1,1[prime]-biphenyl]-4,4[prime]-diyl)bis(azo)bis[5-amino-4-hydroxy]-, tetrasodium salt
U279		63-25-2	1-Naphthalenol, methylcarbamate.
U166		130-15-4	1,4-Naphthoquinone
U167		134-32-7	alpha-Naphthylamine
U168		91-59-8	beta-Naphthylamine
U217		10102-45-1	Nitric acid, thallium(1+) salt
U169		98-95-3	Nitrobenzene (I,T)
U170		100-02-7	p-Nitrophenol
U171		79-46-9	2-Nitropropane (I,T)
U172		924-16-3	N-Nitrosodi-n-butylamine
U173		1116-54-7	N-Nitrosodiethanolamine
U174		55-18-5	N-Nitrosodiethylamine
U176		759-73-9	N-Nitroso-N-ethylurea
U177		684-93-5	N-Nitroso-N-methylurea
U178		615-53-2	N-Nitroso-N-methylurethane
U179		100-75-4	N-Nitrosopiperidine
U180		930-55-2	N-Nitrosopyrrolidine
U181		99-55-8	5-Nitro-o-toluidine
U193		1120-71-4	1,2-Oxathiolane, 2,2-dioxide
U058		50-18-0	2H-1,3,2-Oxazaphosphorin-2-amine, N,N-bis(2-chloroethyl)tetrahydro-, 2-oxide
U115		75-21-8	Oxirane (I,T)
U126		765-34-4	Oxiranecarboxyaldehyde
U041		106-89-8	Oxirane, (chloromethyl)-
	2	123-63-7	Paraldehyde
U183		608-93-5	Pentachlorobenzene
U184		76-01-7	Pentachloroethane
U185		82-68-8	Pentachloronitrobenzene (PCNB)
See F027		87-86-5	Pentachlorophenol
U161		108-10-1	Pentanol, 4-methyl-
U186		504-60-9	1,3-Pentadiene (I)
U187		62-44-2	Phenacetin
U188		108-95-2	Phenol
U048		95-57-8	Phenol, 2-chloro-
U039		59-50-7	Phenol, 4-chloro-3-methyl-
U081		120-83-2	Phenol, 2,4-dichloro-
U082		87-65-0	Phenol, 2,6-dichloro-
U089		56-53-1	Phenol, 4,4[prime]-(1,2-diethyl-1,2-ethenediyl)bis-, (E)-
U101		105-67-9	Phenol, 2,4-dimethyl-
U052		1319-77-3	Phenol, methyl-
U132		70-30-4	Phenol, 2,2[prime]-methylenebis[3,4,6-trichloro-
U411		114-26-1	Phenol, 2-(1-methylethoxy)-, methylcarbamate.
U170		100-02-7	Phenol, 4-nitro-
See F027		87-86-5	Phenol, pentachloro-
See F027		58-90-2	Phenol, 2,3,4,6-tetrachloro-
See F027		95-95-4	Phenol, 2,4,5-trichloro-
See F027		88-06-2	Phenol, 2,4,6-trichloro-
U150		148-82-3	L-Phenylalanine, 4-[bis(2-chloroethyl)amino]-
U145		7446-27-7	Phosphoric acid, lead(2+) salt (2:3)

U087	3288-58-2	Phosphorodithioic acid, O,O-diethyl S-methyl ester
U189	1314-80-3	Phosphorus sulfide (R)
U190	85-44-9	Phthalic anhydride
U191	109-06-8	2-Picoline
U179	100-75-4	Piperidine, 1-nitroso-
U192	23950-58-5	Pronamide
U194	107-10-8	1-Propanamine (I,T)
U111	621-64-7	1-Propanamine, N-nitroso-N-propyl-
U110	142-84-7	1-Propanamine, N-propyl- (I)
U066	96-12-8	Propane, 1,2-dibromo-3-chloro-
U083	78-87-5	Propane, 1,2-dichloro-
U149	109-77-3	Propanedinitrile
U171	79-46-9	Propane, 2-nitro- (I,T)
U027	108-60-1	Propane, 2,2[prime]-oxybis[2-chloro-
U193	1120-71-4	1,3-Propane sultone
See F027	93-72-1	Propanoic acid, 2-(2,4,5-trichlorophenoxy)-
U235	126-72-7	1-Propanol, 2,3-dibromo-, phosphate (3:1)
U140	78-83-1	1-Propanol, 2-methyl- (I,T)
U002	67-64-1	2-Propanone (I)
U007	79-06-1	2-Propenamide
U084	542-75-6	1-Propene, 1,3-dichloro-
U243	1888-71-7	1-Propene, 1,1,2,3,3,3-hexachloro-
U009	107-13-1	2-Propenenitrile
U152	126-98-7	2-Propenenitrile, 2-methyl- (I,T)
U008	79-10-7	2-Propenoic acid (I)
U113	140-88-5	2-Propenoic acid, ethyl ester (I)
U118	97-63-2	2-Propenoic acid, 2-methyl-, ethyl ester
U162	80-62-6	2-Propenoic acid, 2-methyl-, methyl ester (I,T)
U373	122-42-9	Propham.
U411	114-26-1	Propoxur.
U387	52888-80-9	Prosulfocarb.
U194	107-10-8	n-Propylamine (I,T)
U083	78-87-5	Propylene dichloride
U148	123-33-1	3,6-Pyridazinedione, 1,2-dihydro-
U196	110-86-1	Pyridine
U191	109-06-8	Pyridine, 2-methyl-
U237	66-75-1	2,4-(1H,3H)-Pyrimidinedione, 5-[bis(2-chloroethyl)amino]-
U164	56-04-2	4(1H)-Pyrimidinone, 2,3-dihydro-6-methyl-2-thioxo-
U180	930-55-2	Pyrrolidine, 1-nitroso-
U200	50-55-5	Reserpine
U201	108-46-3	Resorcinol
U202	\1\ 81-07-2	Saccharin, & salts
U203	94-59-7	Safrole
U204	7783-00-8	Selenious acid
U204	7783-00-8	Selenium dioxide
U205	7488-56-4	Selenium sulfide
U205	7488-56-4	Selenium sulfide SeS[INF]2[/INF](R,T)
U015	115-02-6	L-Serine, diazoacetate (ester)
See F027	93-72-1	Silvex (2,4,5-TP)
U206	18883-66-4	Streptozotocin

U103	77-78-1	Sulfuric acid, dimethyl ester
U189	1314-80-3	Sulfur phosphide (R)
See F027	93-76-5	2,4,5-T
U207	95-94-3	1,2,4,5-Tetrachlorobenzene
U208	630-20-6	1,1,1,2-Tetrachloroethane
U209	79-34-5	1,1,2,2-Tetrachloroethane
U210	127-18-4	Tetrachloroethylene
See F027	58-90-2	2,3,4,6-Tetrachlorophenol
U213	109-99-9	Tetrahydrofuran (I)
U214	563-68-8	Thallium(I) acetate
U215	6533-73-9	Thallium(I) carbonate
U216	7791-12-0	Thallium(I) chloride
U216	7791-12-0	Thallium chloride Tlcl
U217	10102-45-1	Thallium(I) nitrate
U218	62-55-5	Thioacetamide
U410	59669-26-0	Thiodicarb.
U153	74-93-1	Thiomethanol (I,T)
U244	137-26-8	Thioperoxydicarbonic diamide [(H[INF]2[/INF] N)C(S)][INF]2[/INF] S[INF]2[/INF], tetramethyl-
U409	23564-05-8	Thiophanate-methyl.
U219	62-56-6	Thiourea
U244	137-26-8	Thiram
U220	108-88-3	Toluene
U221	25376-45-8	Toluenediamine
U223	26471-62-5	Toluene diisocyanate (R,T)
U328	95-53-4	o-Toluidine
U353	106-49-0	p-Toluidine
U222	636-21-5	o-Toluidine hydrochloride
U389	2303-17-5	Triallate.
U011	61-82-5	1H-1,2,4-Triazol-3-amine
U227	79-00-5	1,1,2-Trichloroethane
U228	79-01-6	Trichloroethylene
U121	75-69-4	Trichloromonofluoromethane
See F027	95-95-4	2,4,5-Trichlorophenol
See F027	88-06-2	2,4,6-Trichlorophenol
U404	121-44-8	Triethylamine.
U234	99-35-4	1,3,5-Trinitrobenzene (R,T)
U182	123-63-7	1,3,5-Trioxane, 2,4,6-trimethyl-
U235	126-72-7	Tris(2,3-dibromopropyl) phosphate
U236	72-57-1	Trypan blue
U237	66-75-1	Uracil mustard
U176	759-73-9	Urea, N-ethyl-N-nitroso-
U177	684-93-5	Urea, N-methyl-N-nitroso-
U043	75-01-4	Vinyl chloride
U248	\1\ 81-81-2	Warfarin, & salts, when present at concentrations of 0.3% or less
U239	1330-20-7	Xylene (I)
U200	50-55-5	Yohimban-16-carboxylic acid, 11,17-dimethoxy-18-[(3,4,5-trimethoxybenzoyl)oxy]-, methyl ester,(3beta,16beta,17alpha ,18beta,20alpha)-
U249	1314-84-7	Zinc phosphide Zn[INF]3[/INF] P[INF]2[INF], when present at concentrations of 10% or less

\1\ CAS Number given for parent compound only.

Appendix C

EPA P List

The primary hazardous properties of these materials have been indicated by the letters T (Toxicity), R (Reactivity), I (Ignitability) and C (Corrosivity). Absence of a letter indicates that the compound is only listed for toxicity.

These wastes and their corresponding EPA Hazardous Waste Numbers are:

Hazardous waste No.	Chemical abstracts No.	Substance
P023	107-20-0	Acetaldehyde, chloro-
P002	591-08-2	Acetamide, N-(aminothioxomethyl)-
P057	640-19-7	Acetamide, 2-fluoro-
P058	62-74-8	Acetic acid, fluoro-, sodium salt
P002	591-08-2	1-Acetyl-2-thiourea
P003	107-02-8	Acrolein
P070	116-06-3	Aldicarb
P203	1646-88-4	Aldicarb sulfone.
P004	309-00-2	Aldrin
P005	107-18-6	Allyl alcohol
P006	20859-73-8	Aluminum phosphide (R,T)
P007	2763-96-4	5-(Aminomethyl)-3-isoxazolol
P008	504-24-5	4-Aminopyridine
P009	131-74-8	Ammonium picrate (R)
P119	7803-55-6	Ammonium vanadate
P099	506-61-6	Argentate(1-), bis(cyano-C)-, potassium
P010	7778-39-4	Arsenic acid H[INF]3[/INF] AsO[INF]4[/INF]
P012	1327-53-3	Arsenic oxide As[INF]2[/INF] O[INF]3[/INF]
P011	1303-28-2	Arsenic oxide As[INF]2[/INF] O[INF]5[/INF]
P011	1303-28-2	Arsenic pentoxide
P012	1327-53-3	Arsenic trioxide
P038	692-42-2	Arsine, diethyl-
P036	696-28-6	Arsonous dichloride, phenyl-
P054	151-56-4	Aziridine
P067	75-55-8	Aziridine, 2-methyl-
P013	542-62-1	Barium cyanide
P024	106-47-8	Benzenamine, 4-chloro-
P077	100-01-6	Benzenamine, 4-nitro-
P028	100-44-7	Benzene, (chloromethyl)-
P042	51-43-4	1,2-Benzenediol, 4-[1-hydroxy-2-(methylamino)ethyl]-, (R)-
P046	122-09-8	Benzeneethanamine, alpha,alpha-dimethyl-
P014	108-98-5	Benzenethiol
P127	1563-66-2	7-Benzofuranol, 2,3-dihydro-2,2-dimethyl-, methylcarbamate.
P188	57-64-7	Benzoic acid, 2-hydroxy-, compd. with

		(3aS-cis)-1,2,3,3a,8,8a-hexahydro-1,3a,8-trimethylpyrrolo[2,3-b]indol-5-yl methylcarbamate ester (1:1).
P001	\1\ 81-81-2	2H-1-Benzopyran-2-one, 4-hydroxy-3-(3-oxo-1-phenylbutyl)-, & salts,when present at concentrations greater than 0.3%
P028	100-44-7	Benzyl chloride
P015	7440-41-7	Beryllium powder
P017	598-31-2	Bromoacetone
P018	357-57-3	Brucine
P045	39196-18-4	2-Butanone, 3,3-dimethyl-1-(methylthio)-, O-[methylamino)carbonyl] oxime
P021	592-01-8	Calcium cyanide
P021	592-01-8	Calcium cyanide Ca(CN)[INF]2[/INF]
P189	55285-14-8	Carbamic acid, [(dibutylamino)-thio]methyl-, 2,3-dihydro-2,2-dimethyl- 7-benzofuranyl ester.
P191	644-64-4	Carbamic acid, dimethyl-, 1-[(dimethyl-amino)carbonyl]- 5-methyl-1H- pyrazol-3-yl ester.
P192	119-38-0	Carbamic acid, dimethyl-, 3-methyl-1-(1-methylethyl)-1H- pyrazol-5-yl ester.
P190	1129-41-5	Carbamic acid, methyl-, 3-methylphenyl ester.
P127	1563-66-2	Carbofuran.
P022	75-15-0	Carbon disulfide
P095	75-44-5	Carbonic dichloride
P189	55285-14-8	Carbosulfan.
P023	107-20-0	Chloroacetaldehyde
P024	106-47-8	p-Chloroaniline
P026	5344-82-1	1-(o-Chlorophenyl)thiourea
P027	542-76-7	3-Chloropropionitrile
P029	544-92-3	Copper cyanide
P029	544-92-3	Copper cyanide Cu(CN)
P202	64-00-6	m-Cumenyl methylcarbamate.
P030	.....	Cyanides (soluble cyanide salts), not otherwise specified
P031	460-19-5	Cyanogen
P033	506-77-4	Cyanogen chloride
P033	506-77-4	Cyanogen chloride (CN)Cl
P034	131-89-5	2-Cyclohexyl-4,6-dinitrophenol
P016	542-88-1	Dichloromethyl ether
P036	696-28-6	Dichlorophenylarsine
P037	60-57-1	Dieldrin
P038	692-42-2	Diethylarsine
P041	311-45-5	Diethyl-p-nitrophenyl phosphate
P040	297-97-2	O,O-Diethyl O-pyrazinyl phosphorothioate
P043	55-91-4	Diisopropylfluorophosphate (DFP)
P004	309-00-2	1,4,5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexa- chloro-1,4,4a,5,8,8a,-hexahydro-, (1alpha,4alpha,4abeta,5alpha,8alpha,8abeta)-1,1,1-

P060		465-73-6	1,4,5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexa- chloro- 1,4,4a,5,8,8a-hexahydro-, (1alpha,4alpha,4abeta,5beta ,8beta,8abeta)-
P037		60-57-1	2,7:3,6-Dimethanonaphth[2,3- b]oxirene,3,4,5,6,9,9-hexachloro- 1a,2,2a,3,6,6a,7,7a-octahydro -,(1aalpha,2beta,2aalpha,3beta ,6beta,6alpha,7beta, 7aalpha)-
P051	\1\	72-20-8	2,7:3,6-Dimethanonaphth [2,3- b]oxirene, 3,4,5,6,9,9-hexachloro- 1a,2,2a,3,6,6a,7,7a-octahydro-, (1aalpha,2beta,2abeta,3alpha,6alpha,6 abeta,7beta, 7aalpha)-, & metabolites
P044		60-51-5	Dimethoate
P046		122-09-8	alpha,alpha-Dimethylphenethylamine
P191		644-64-4	Dimetilan.
P047	\1\	534-52-1	4,6-Dinitro-o-cresol, & salts
P048		51-28-5	2,4-Dinitrophenol
P020		88-85-7	Dinoseb
P085		152-16-9	Diphosphoramide, octamethyl-
P111		107-49-3	Diphosphoric acid, tetraethyl ester
P039		298-04-4	Disulfoton
P049		541-53-7	Dithiobiuret
P185		26419-73-8	1,3-Dithiolane-2-carboxaldehyde, 2,4- dimethyl-, O- [(methylamino)- carbonyl]oxime.
P050		115-29-7	Endosulfan
P088		145-73-3	Endothall
P051		72-20-8	Endrin
P051		72-20-8	Endrin, & metabolites
P042		51-43-4	Epinephrine
P031		460-19-5	Ethanedinitrile
P194		23135-22-0	Ethanimidothioc acid, 2- (dimethylamino)-N-[[(methylamino) carbonyl]oxy]-2-oxo-, methyl ester.
P066		16752-77-5	Ethanimidothioic acid, N-[[(methylamino)carbonyl]oxy]-, methyl ester
P101		107-12-0	Ethyl cyanide
P054		151-56-4	Ethyleneimine
P097		52-85-7	Famphur
P056		7782-41-4	Fluorine
P057		640-19-7	Fluoroacetamide
P058		62-74-8	Fluoroacetic acid, sodium salt
P198		23422-53-9	Formetanate hydrochloride.
P197		17702-57-7	Formparanate.
P065		628-86-4	Fulminic acid, mercury(2+) salt (R,T)
P059		76-44-8	Heptachlor
P062		757-58-4	Hexaethyl tetraphosphate
P116		79-19-6	Hydrazinecarbothioamide
P068		60-34-4	Hydrazine, methyl-
P063		74-90-8	Hydrocyanic acid
P063		74-90-8	Hydrogen cyanide
P096		7803-51-2	Hydrogen phosphide

P060	465-73-6	Isodrin
P192	119-38-0	Isolan.
P202	64-00-6	3-Isopropylphenyl N-methylcarbamate.
P007	2763-96-4	3(2H)-Isoxazolone, 5-(aminomethyl)-
P196	15339-36-3	Manganese, bis(dimethylcarbamodithioato-S,S[prime])-,
P196	15339-36-3	Manganese dimethyldithiocarbamate.
P092	62-38-4	Mercury, (acetato-O)phenyl-
P065	628-86-4	Mercury fulminate (R,T)
P082	62-75-9	Methanamine, N-methyl-N-nitroso-
P064	624-83-9	Methane, isocyanato-
P016	542-88-1	Methane, oxybis[chloro-
P112	509-14-8	Methane, tetranitro- (R)
P118	75-70-7	Methanethiol, trichloro-
P198	23422-53-9	Methanimidamide, N,N-dimethyl-N[prime]-[3-[[(methylamino)-carbonyl]oxy]phenyl]-,monohydrochloride.
P197	17702-57-7	Methanimidamide, N,N-dimethyl-N[prime]-[2-methyl-4 -[[(methylamino)carbonyl]oxy]phenyl]-
P050	115-29-7	6,9-Methano-2,4,3-benzodioxathiepin, 6,7,8,9,10,10-hexachloro-1,5,5a,6,9,9a-hexahydro-, 3-oxide
P059	76-44-8	4,7-Methano-1H-indene, 1,4,5,6,7,8,8-heptachloro-3a,4,7,7a-tetrahydro-
P199	2032-65-7	Methiocarb.
P066	16752-77-5	Methomyl
P068	60-34-4	Methyl hydrazine
P064	624-83-9	Methyl isocyanate
P069	75-86-5	2-Methyllactonitrile
P071	298-00-0	Methyl parathion
P190	1129-41-5	Metolcarb.
P128	315-8-4	Mexacarbate.
P072	86-88-4	alpha-Naphthylthiourea
P073	13463-39-3	Nickel carbonyl
P073	13463-39-3	Nickel carbonyl Ni(CO)[INF]4[/INF], (T-4)-
P074	557-19-7	Nickel cyanide
P074	557-19-7	Nickel cynaide Ni(CN)[INF]2[/INF]
P075	\1\ 54-11-5	Nicotine, & salts
P076	10102-43-9	Nitric oxide
P077	100-01-6	p-Nitroaniline
P078	10102-44-0	Nitrogen dioxide
P076	10102-43-9	Nitrogen oxide NO
P078	10102-44-0	Nitrogen oxide NO[INF]2[/INF]
P081	55-63-0	Nitroglycerine (R)
P082	62-75-9	N-Nitrosodimethylamine
P084	4549-40-0	N-Nitrosomethylvinylamine
P085	152-16-9	Octamethylpyrophosphoramide
P087	20816-12-0	Osmium oxide OsO[INF]4[/INF], (T-4)-
P087	20816-12-0	Osmium tetroxide
P088	145-73-3	7-Oxabicyclo[2.2.1]heptane-2,3-dicarboxylic acid

P194	23135-22-0	Oxamyl.
P089	56-38-2	Parathion
P034	131-89-5	Phenol, 2-cyclohexyl-4,6-dinitro-
P048	51-28-5	Phenol, 2,4-dinitro-
P047	\1\ 534-52-1	Phenol, 2-methyl-4,6-dinitro-, & salts
P020	88-85-7	Phenol, 2-(1-methylpropyl)-4,6-dinitro-
P009	131-74-8	Phenol, 2,4,6-trinitro-, ammonium salt(R)
P128	315-18-4	Phenol, 4-(dimethylamino)-3,5-dimethyl-, methylcarbamate (ester).
P199	2032-65-7	Phenol, (3,5-dimethyl-4-(methylthio)-,methylcarbamate
P202	64-00-6	Phenol, 3-(1-methylethyl)-, methyl carbamate.
P201	2631-37-0	Phenol, 3-methyl-5-(1-methylethyl)-, methyl carbamate.
P092	62-38-4	Phenylmercury acetate
P093	103-85-5	Phenylthiourea
P094	298-02-2	Phorate
P095	75-44-5	Phosgene
P096	7803-51-2	Phosphine
P041	311-45-5	Phosphoric acid, diethyl 4-nitrophenyl ester
P039	298-04-4	Phosphorodithioic acid, O,O-diethyl S-[2-(ethylthio)ethyl] ester
P094	298-02-2	Phosphorodithioic acid, O,O-diethyl S-[(ethylthio)methyl] ester
P044	60-51-5	Phosphorodithioic acid, O,O-dimethyl S-[2-(methylamino)-2-oxoethyl] ester
P043	55-91-4	Phosphorofluoridic acid, bis(1-methylethyl) ester
P089	56-38-2	Phosphorothioic acid, O,O-diethyl O -(4-nitrophenyl) ester
P040	297-97-2	Phosphorothioic acid, O,O-diethyl O-pyrazinyl ester
P097	52-85-7	Phosphorothioic acid, O-[4[(dimethylamino)sulfonyl] phenyl]O,O-dimethyl ester
P071	298-00-0	Phosphorothioic acid, O,O,-dimethyl O-(4-nitrophenyl) ester
P204	57-47-6	Physostigmine.
P188	57-64-7	Physostigmine salicylate.
P110	78-00-2	Plumbane, tetraethyl-
P098	151-50-8	Potassium cyanide
P098	151-50-8	Potassium cyanide K(CN)
P099	506-61-6	Potassium silver cyanide
P201	2631-37-0	Promecarb
P070	116-06-3	Propanal, 2-methyl-2-(methylthio)-, O-[(methylamino)carbonyl]oxime
P203	1646-88-4	Propanal, 2-methyl-2-(methyl-sulfonyl)-, O-[(methylamino)carbonyl] oxime.
P101	107-12-0	Propanenitrile
P027	542-76-7	Propanenitrile, 3-chloro-
P069	75-86-5	Propanenitrile, 2-hydroxy-2-methyl-

P081	55-63-0	1,2,3-Propanetriol, trinitrate (R)
P017	598-31-2	2-Propanone, 1-bromo-
P102	107-19-7	Propargyl alcohol
P003	107-02-8	2-Propenal
P005	107-18-6	2-Propen-1-ol
P067	75-55-8	1,2-Propylenimine
P102	107-19-7	2-Propyn-1-ol
P008	504-24-5	4-Pyridinamine
P075	\1\ 54-11-5	Pyridine, 3-(1-methyl-2-pyrrolidinyl)-, (S)-, & salts
P204	57-47-6	Pyrrolo[2,3-b]indol-5-ol, 1,2,3,3a,8,8a-hexahydro-1,3a,8-trimethyl-, methylcarbamate (ester), (3aS-cis)-.
P114	12039-52-0	Selenious acid, dithallium(1+) salt
P103	630-10-4	Selenourea
P104	506-64-9	Silver cyanide
P104	506-64-9	Silver cyanide Ag(CN)
P105	26628-22-8	Sodium azide
P106	143-33-9	Sodium cyanide
P106	143-33-9	Sodium cyanide Na(CN)
P108	\1\ 57-24-9	Strychnidin-10-one, & salts
P018	357-57-3	Strychnidin-10-one, 2,3-dimethoxy-
P108	\1\ 57-24-9	Strychnine, & salts
P115	7446-18-6	Sulfuric acid, dithallium(1+) salt
P109	3689-24-5	Tetraethyldithiopyrophosphate
P110	78-00-2	Tetraethyl lead
P111	107-49-3	Tetraethyl pyrophosphate
P112	509-14-8	Tetranitromethane (R)
P062	757-58-4	Tetraphosphoric acid, hexaethyl ester
P113	1314-32-5	Thallic oxide
P113	1314-32-5	Thallium oxide Tl[INF]2[/INF] O[INF]3[/INF]
P114	12039-52-0	Thallium(I) selenite
P115	7446-18-6	Thallium(I) sulfate
P109	3689-24-5	Thiodiphosphoric acid, tetraethyl ester
P045	39196-18-4	Thiofanox
P049	541-53-7	Thioimidodicarbonic diamide [(H[INF]2[/INF] N)C(S)][INF]2[/INF] NH
P014	108-98-5	Thiophenol
P116	79-19-6	Thiosemicarbazide
P026	5344-82-1	Thiourea, (2-chlorophenyl)-
P072	86-88-4	Thiourea, 1-naphthalenyl-
P093	103-85-5	Thiourea, phenyl-
P185	26419-73-8	Tirpate.
P123	8001-35-2	Toxaphene
P118	75-70-7	Trichloromethanethiol
P119	7803-55-6	Vanadic acid, ammonium salt
P120	1314-62-1	Vanadium oxide V[INF]2[/INF] O[INF]5[/INF]
P120	1314-62-1	Vanadium pentoxide
P084	4549-40-0	Vinylamine, N-methyl-N-nitroso-
P001	\1\ 81-81-2	Warfarin, & salts, when present at concentrations greater than 0.3%
P205	137-30-4	Zinc, bis(dimethylcarbamodithioato-

		S,S[prime])-,
P121	557-21-1	Zinc cyanide
P121	557-21-1	Zinc cyanide Zn(CN)[INF]2[/INF]
P122	1314-84-7	Zinc phosphide Zn[INF]3[/INF] P[INF]2[/INF], when present at concentrations greater than 10% (R,T)
P205	137-30-4	Ziram.

\1\ CAS Number given for parent compound only.

APPENDIX D

GLOVE SELECTION CHART

Chemical resistant gloves are an important aspect of protection against hazardous materials. It is critical that users select the correct glove material based on the chemicals used and the glove's permeation data. Inappropriate use of glove material may actually injure a worker as chemicals can quickly permeate the barrier. Please review the manufacturer, test data, and glove usage recommendations. Together the information will allow you to select the best glove material for your application. If you have any questions on glove selection, contact the Director of Environmental Health & Safety at 245-1495 or 752-5219.

Chemical Family	Butyl Rubber	Neoprene	PVC (Vinyl)	Nitrile	Natural Latex
Acetates	G	NR	NR	NR	NR
Acids, inorganic	G	E	E	E	E
Acids, organic	E	E	E	E	E
Acetonitrile, Acrylonitrile	G	E	G	S	E
Alcohols	E	E	NR	E	E
Aldehydes	E	G	NR	S*	NR
Amines	S	NR	NR	F	NR
Bases, inorganic	E	E	E	E	E
Ethers	G	F	NR	E	NR
Halogens (liquids)	G	NR	F	E	NR
Inks	G	E	E	S	F
Ketones	E	G	NR	NR	G
Nitro compounds (Nitrobenzene, Nitromethane)	G	NR	NR	NR	NR
Oleic Acid	E	E	F	E	NR
Phenols	E	E	NR	NR	G
Quinones	NR	E	G	E	E
Solvents, Aliphatic	NR	NR	F	G	NR
Solvents, Aliphatic	NR	NR	F	F	NR

S - Superior, E - Excellent, G - Good, F - Fair, NR - Not Recommended.

*Not recommended for Acetaldehyde, use Butyl Rubber

The performance of gloves depend on their thickness and conditions of manufacture, as well as their material of construction. It is best to consult the manufacturers' glove selection guides.

Appendix E:

Studio Safety Site-Specific Training Checklist

Dear Supervisor:

_____ has completed the following training as
(Print Employee's Name Here)

required by the Studio Safety Program on

_____:
(Date of Training)

□ **Initial Training** □ **Refresher Training**

In order to complete the training requirements of the Studio Safety Program, please review the site-specific training items listed below with the employee. Please check each item as it is reviewed or write N/A if it is not applicable to your work area. Once completed, please sign and date the bottom of the checklist and keep in your departmental files. Thank you for your cooperation and assistance.

Personal Protective Equipment (PPE)

_____ Explanation of what kinds of PPE are required for specific tasks

_____ How to use the PPE

_____ Location and Availability of PPE

_____ Maintenance and reusable PPE (cleaning, storage, and inspection)

Engineering and Work Practice Controls

_____ Explanation of site-specific standard operating procedures (e.g.— storage requirements, labeling requirements, permissible exposure limits, special precautions, decontamination procedures)
_____ Explanation of engineering controls that are specific to the work environment (e.g., eyewash facilities, safety showers, fume hoods)

Hazardous Waste Handling

_____ Discussion and clarification of which wastes generated in the work area are hazardous and how those items are to be segregated, stored, transported, treated and disposed of.
_____ Review of hazardous waste labeling and pick-up procedures as they apply to the work area.

Spill Response/Exposure Incident Response/Exposure Control Plan

_____ Review of work area's procedure for handling fires and spills (including the location and availability of spill kits)
_____ Review of exposure incident response procedure

_____ Location of the Dickinson College Studio Safety Plan

Verification of Training

I certify that the employee above has received site-specific training as required by the Dickinson College Studio Safety Plan.

NAME OF EMPLOYEE:_____

SIGNATURE OF EMPLOYEE:_____

TODAY'S DATE:_____

NAME OF SUPERVISOR:_____

SIGNATURE OF SUPERVISOR:_____

TODAY'S DATE:_____

APPENDIX F

Chemical Injury/Exposure Report

Name of Exposed_____SS#_____

Date of Exposure_____Time_____Location_____

Job or Duty Being Performed_____

Injury/Exposure Description _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Post-Exposure Treatment Recommended Yes_____ No_____ Date/Time_____

Referred to_____

I verify that the information is correct.

Supervisor Name_____Signature_____

Date_____Time_____

APPENDIX G

FLAMMABLE AND COMBUSTIBLE LIQUID CONTAINMENT AND STORAGE REQUIREMENTS FOR TEACHING STUDIOS

Containment

Only approved containers authorized by NFPA (National Fire Protection Association) 30 shall be used to store flammable liquids.

	Flammable Class			**Combustible Class**	
Container	**II**	**IB**	**IC**	**II**	**IIIA**
Glass or Approved Plastic	1 pt	1 qt	1 gal	1 gal	1 gal
Metal	1 gal	1 gal	1 gal	1 gal	5 gal
Safety Cans	2 gal	2 gal	2 gal	2 gal	5 gal
Metal Drums	1 gal	1 gal	1 gal	1 gal	60 gal

Maximum Storage Quantities: Maximum of 10 gal of Class I and II or maximum of 25 gal in safety cans.