UNIVERSITY
of ST. THOMAS
MINNESOTA

Hazardous Waste Training

Hazardous Waste Training – University of Saint Thomas

Introduction 1
Who needs hazardous waste training? 1
Why are you required to have this training? 1
Resource Conservation and Recovery Act (RCRA) 1
It only takes a Little Bit 2
Ramsey County's Hazardous Waste Program 2
Regulated Businesses: 2
Inspection Priorities: 2
Evaluation of Wastes 3
What is Waste? 3
Waste Classes 3
Listed Wastes: 3
Characteristic Wastes 4
Mixtures of Waste 5
Dilution is not the Solution: 5
Inherently Like Waste Materials: 5
State Designated Wastes 5
Exempt 6
Rules for Empty Containers 6
Empty Containers that once held acute wastes are exempt if: 6
Toxicity Characteristic Leachate Procedure (TCLP) – a lab testing procedure 6
Contaminant Categories 6
Accumulation and Storage Limits 7
Chemical Waste: 7
Disposal of Hazardous Waste 7
Container Requirements 7
Segregation of Waste 8
Recording Requirements 8
Inspection Requirements 8
Transfer of Hazardous Waste 9
Disposal to Atmosphere 11
Waste Minimization 11

Special Wastes 11
Batteries 11
Fluorescent Lamps 12
Infectious Waste 13
Photographic Waste 14
Radioactive Waste 14
Preparedness, prevention, records 15
Emergency Procedures - Chemical Spill or Release 15
Appendix A: 19
Hazardous Waste Form: 19
Hazardous Waste Area Inspection Record: 20
Incident Investigation Guidelines and Incident Report: 21
Incident Investigation 21
Incident Review by Laboratory Safety Committee 21

Introduction

Who needs hazardous waste training?

- Everyone who works in the sciences and engineering, conducting research, teaching in laboratories, assisting in laboratories, or working in an area that generates or stores hazardous waste. This includes faculty, staff, student workers, and unpaid individuals working in the laboratory.
- Students taking laboratory based classes that generate hazardous waste.
  Students should receive instruction in how to deal with hazardous waste generated in the teaching laboratory from their instructor. It is the responsibility of the instructor to provide the instruction and monitor that the rules are being followed during the laboratory. Inspecting a laboratory on entering and prior to leaving the laboratory, and providing any corrective actions needed prior to leaving a laboratory.

Why are you required to have this training?

Federal, State, County and local laws require that training is given by employers or supervisors within businesses. Records of the training and the materials presented need to be retained for a period of 3 years.

Ramsey County, in which Saint Thomas is located, requires a permit to generate hazardous waste, use sanitary sewer systems, transport trash and waste over its roads. It may also conduct inspections to verify that the laws that are set forth are followed and training has been conducted. Records of a safety plan and standard operating procedures can be requested.

Resource Conservation and Recovery Act (RCRA)

This legislation is the foundation for much of the rules that we follow today. It was a cornerstone legislation based upon public concerns due to contamination of creeks, rivers and fields. A main point in the legislation created Cradle to Grave Liability.
Businesses are required to:

- Evaluate Waste
- Obtain Licensing
- Comply with Storage Requirements
- Dispose of materials properly
- Plan for Emergencies
- Provide and Document Training

It only takes a Little Bit[1]

Waste type and amount needed to contaminate 10 million gallons of drinking water:
Acetone (Fiberglass clean up), 7 gallons
Methyl Ethyl Ketone (Thinners), 6 gallons
Gasoline (with 5% benzene), 1 gallon
Methylene Chloride (Paint Stripper), ½ gallon
Perc (Dry Cleaning Solvent), ½ Cup

Ramsey County's Hazardous Waste Program

Minnesota is a federally authorized RCRA State
State Statutes mandate county programs
Ramsey County's Program Began in 1980

Regulated Businesses:

- Educational Facilities
- Auto repair / body Shops
- Printers
- Drycleaners
- Platers (ie. Chrome plating on car parts)
- Healthcare Facilities
- Salvage Yards
- Woodworking

Inspection Priorities:

Routine Compliance inspection

- Typically unannounced
- Timing is based upon "risk"
- Generation Size (UST is a Small Quantity Generator[2])
    - Hazard Potential of Chemicals
    - Compliance History

Inspections have regulatory and educational purposes.

The inspector for UST is Michael Reed (as of 11/2013)

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[1] Ramsey County Solid Hazardous Waste and Compliance Program, November 26, 2013
[2] Small Quantity Generator = an entity which generates between 220 to 2200 pounds per month, 1 kg = 2.2 lbs, Minn. Rule 7045.0206

Evaluation of Wastes

What is Waste?[3]

Any solid, liquid, semisolid, or gaseous material resulting from industrial, commercial, mining or agricultural operations, or from community activities, and which:

- Is discarded or is being accumulated, stored or physically, chemically or biologically treated prior to being discarded; or
- Is recycled or is accumulated, stored or treated prior to being recycled; or
- Is a spent material

In the eyes of the County and State, UST is a commercial operation. As a commercial operation we are obligated to follow rules set forth by the governing agencies. Rules for businesses may be stricter than rules for households. Therefore, what you do at home, may not be what you are allowed to do at UST.

Waste Classes

There are several ways that materials are categorized which make them a material that is regulated and requires proper treatment. The classes of materials are listed below, followed by in-depth characterizations of those classes:

- Listed Wastes
- Characteristic Wastes
- Mixtures of Wastes
- State Designated Wastes
- Hazardous Waste with Reduced Requirements
- Inherently Like Waste

Listed Wastes:

Listed wastes are wastes that are "listed". The lists were generated at the federal level and are listed in the Code of Federal Regulations (CFR). There are four main categories for listed chemicals:

F – List: Hazardous wastes from non-specific sources

K – List: Hazardous wastes from specific industry sources

P – List: Acutely toxic discarded commercial chemical products, off spec products, containers and spill residues
http://www.pca.state.mn.us/index.php/view-document.html?gid=4019

U – List: Discarded Commercial Chemical Products
http://www.pca.state.mn.us/index.php/view-document.html?gid=4020

[3] Ramsey County Solid Hazardous Waste and Compliance Program, November 26, 2013 (Minnesota Rule 7045.0020 subp.63)

Minnesota has adopted the Federal Lists and included additional items to those lists.

Characteristic Wastes[4]

Materials whether on a list or not, may fall under a material class, Characteristic Wastes. The classes of materials help identify characteristics of the material that may indicate a hazard. The ability to place a material within one of the classes make the material Characteristic of a Hazardous Waste.

Ignitable waste - D001:

A liquid waste having a flash point less than 140° Fahrenheit; or, a non-liquid waste which is capable, under standard temperature and pressure, of causing fire through friction, absorption of moisture, or spontaneous chemical changes and when ignited, burns so vigorously and persistently that it creates a hazard; or, an ignitable compressed gas. Under this classification, the University of Saint Thomas separates this group into sub-classes to aid in the disposal process. The sub classes are" Halogenated – materials that contain halogen atoms. These materials generally are not as flammable, but require special equipment to prevent the release of halogenated gases into the environment during the disposal process of burning. Non-Halogenated: These materials are the most flammable of the group and do not contain sources of Chlorine, Bromine and Fluorine. Aqueous: while not flammable, it is the components within the water that categorize this group. The co-materials are organic molecules that are disposed of by the burning process and cannot be sewered. In some cases the concentration of the organic molecules may be very low and or be extremely soluble in water.

Oxidizing waste - D001:

Wastes which add oxygen to a fire. Oxidizing substances often have per as the beginning of the name, oxide as the ending of the name, or ate in its chemical name.

Corrosive waste - D002:

Water-based waste having a pH of 2.0 or less (strong acids) or 12.5 or more (strong bases); also, any material able to corrode 1/4 inch of steel per year.

Reactive waste - D003:

Unstable or explosive wastes; wastes which react violently in the presence of water; and, sulfide or cyanide- bearing wastes which, when exposed to pH conditions between 2.0 and 12.5, give off toxic vapors.

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[4] Minnesota Polution Control Agency, Basic Hazardous Waste Requirements for Businesses , Hazardous Waste #1.00, September 2003, http://www.pca.state.mn.us/index.php/view-document.html?gid=8993, accessed August 19, 2014

Lethal waste - MN01:

Wastes which have been found through testing to cause death when ingested, inhaled or absorbed.

Toxicity characteristic waste - D004-D043:

Waste which, under acidic conditions, releases toxic metals, pesticides or volatile organic chemicals above certain limits. This classification includes these metals: arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver

Mixtures of Waste

Mixing hazardous materials with other materials is considered treatment. It is unlawful to treat hazardous materials in an effort to make it non-hazardous. The only exception is neutralization. Neutralization of a material is desirable to slow down or inhibit reactivity when mixed with other materials for transportation. Non-neutralized materials generally react to give heat causing violent evolution of solvent materials, cause explosion, and may injure or expose a worker handling the waste for you while on the way to or at the waste treatment site.

Dilution is not the Solution:

The pH scale is logarithmic, Each unit of change equals a power of ten.

Adjusting 1 gallon of Acid, pH = 2 to pH = 3 takes 9 gallons of water
Adjusting 1 gallon of Acid, pH = 2 to pH = 4 takes 99 gallons of water
Adjusting 1 gallon of Acid, pH = 2 to pH = 5 takes 999 gallons of water

Diluting a solution to change the pH is not allowed!

Inherently Like Waste Materials:

- Old Chemicals that can no longer be used
- Chemicals with no Labels
- Old Samples that cannot be identified
- Chemicals unfit for use
- Spills

State Designated Wastes

- MN01 – Lethal Waste
- MN02 – Lab Pack Wastes (collections of small amounts of compatible chemicals)
- MN03 - PCBs
- MN100 – Used Oil
- Mn200 – Used Oil Filters
- MN300 - Used Oil Sorbents

Exempt Wastes

- Household trash and Sewage
- Non-Household Rubbish / Trash
- Scrap Metal if Recycled
- Empty Containers (unless Acute)

Rules for Empty Containers

- All Liquids must be removed
- Less than 1% of residue at the bottom of the container; or
- Less than 3% by weight if the container is smaller than 110 gallons; or
- Less than 0.3% by weight if the container is larger than 110 gallons
- All unless contained an acutely hazardous waste

Empty Containers that once held acute wastes are exempt if:

- The container has been triple rinsed using solvent that is able to remove remaining residue; or
- The container or inner liner has been cleaned by another equally approved method; or
- Manage the inner liner as hazardous waste.

Toxicity Characteristic Leachate Procedure (TCLP) – a lab testing procedure

- Simulates what would occur if waste of this type were landfilled
    - Representative sample or the waste is collected
    - Contaminants are extracted from the sample
    - Contaminant concentration in the extract is measured

Contaminant Categories

- Heavy Metals
- Pesticides and Herbicides
- Additional Organic Compounds

What this means at Saint Thomas.

Because our waste leaves Saint Thomas there are various processes that need to be followed to assure that we are able to abide by the terms of our permit while protecting ourselves, affiliated carriers and the citizens of the city and state.

Accumulation and Storage Limits

Chemical Waste:

The majority of our materials generated fall in the Characteristic Materials category as stated above. As these materials are used in all departments and therefore important that everyone in all departments understand these following guidelines.

Disposal of Hazardous Waste

If you are generating a waste that can neither be sewered or landfilled, you are generating a hazardous waste. Satellite accumulation is a regulatory term that refers to hazardous waste being collected by, and kept under the control of the person who generates it. Therefore, if you are generating and collecting hazardous waste you must adhere to the following satellite accumulation requirements until the waste is transferred to either the Chemistry Stockroom (OWS 485) or has been picked up by the physical plant via a service request.

Container Requirements

The only containers that are capable of containing the materials generated within the laboratories are the glass solvent bottles in which solvents are received and or thick walled HDPE bottles in which solvents were received. The chemistry stockroom has on hand many acceptable containers. Under no circumstances may containers previously used for food be used (ie. Milk jugs, vinegar jugs, oil jugs). Containers of this type are manufactured to contain only the items for which they are intended and break down easily with materials found in laboratories.

Prior to adding any material to a waste container, complete the informational section of a University of Saint Thomas Hazardous Waste Form. Place the Yellow Sticker on the bottle and include the hazard class of material that will be transferred to the container. The hazardous waste form should be located within reaching distance from the waste container / yet not next to the container to avoid the form being destroyed should something unexpected occur. Waste Forms may be retrieved from the Chemistry Stockroom or requested from Environmental Health and Safety.

Keep the waste containers closed at all time, except when adding or removing waste; open funnels sitting in the opening of a waste container is considered an open container by regulatory agencies.

Handle and store waste containers properly to prevent rupture or leakage. Waste containers should be stored in an impermeable secondary container capable of containing a spill and placed either in a hood or flammable cabinet at the work day. A sink, is not a secondary container while pouring. Waste containers should never be stored on the floor, near a sink or on an open bench-top. While filling the container, proper personal protective equipment should be used that protects from both the material in the container and in the container from which you are pouring.

Waste containers must be accessible and not obstructed. Adequate aisle space between the location of your waste and the exit / entrance door must be maintained, 36 inches is the standard. This allows room for emergency personnel to access the location in the case of an emergency, or you to exit from the location quickly.

Segregation of Waste

Known hazardous wastes should be kept as segregated as possible. For example, if you have a solution of a known carcinogen (50 mL), it should not be poured into a 4000 mL waste container and diluted with other waste solvents. Under the law, you would have created 4000 mL of known hazardous waste (listed waste) as opposed to characteristic hazardous waste.

Like hazardous waste should be stored with like hazardous waste and separated by incompatibility. If you are working with both oxidizers and reducing agents, it would not make sense to mix the two together into the same waste container. This would cause a reaction and potentially injure someone or create a spill. It is therefore your responsibility to protect others by segregating waste by the previously described hazard categories. It is also your responsibility to make sure the waste container is labeled with "Hazardous Waste" and the Class of material contained within, so that someone else knows not to add an oxidizer to your reducing agent. The pH of the materials being added to the container should also be tested and adjusted to $8 > pH > 5$ prior to addition in order to limit reactivity.

Recording Requirements

At the time of any material being added to the container, the full name of the material added must be recorded on the waste form. The full name must include the concentration of any solutions and the solute of any solution listed. (ie. 10% Hydrochloric Acid in water or 10% hydrochloric acid (aq) or concentrated hydrochloric acid but not HCl (aq), conc. HCl) You may also choose to write out the individual

Inspection Requirements

The containers should be inspected weekly. The inspection should include verifying the containers have remained intact, are clean, no spills, is labeled correctly, is closed while not in use, is not full or ready to be moved to permanent storage, has not fallen below 10% head space and are segregated accordingly. The total amount of material for each class must not exceed 55 gallons. The inspection of the area must be recorded utilizing the University of Saint Thomas Hazardous Area Inspection Form (appendix). On the form, notations should be given when the area is not up to specifications and be initialed and dated. The signature and the initials for anyone responsible for the inspection area should be located together somewhere on the form.

Know what is required of you by your Campus emergency response plan should a spill occur; keep suitable spill control equipment on hand and keep emergency phone numbers posted in your lab or work area. See the Emergency Response section of this guide for additional information.

Transfer of Hazardous Waste

Once a container is filled, date the Hazardous Waste Sticker on the bottle and on the corresponding Hazardous Waste Form.

Once a container is full, date the container and either bring the container, in a secondary container (bucket) to the chemistry stockroom or contact the physical plant, to ensure the waste is transferred to the Campus hazardous waste storage site within three days.

Summary for Waste Disposal: (post near the satellite waste site)

Waste containers and hazardous waste forms

- Use a container that is approved for the waste material -- glass or heavy walled HDPE
- Place the Yellow Hazardous Waste sticker on the Bottle and include the waste class on the sticker

  (Halogenated Waste, Non-Halogenated Waste and Aqueous Waste)

- Complete a University of Saint Thomas Waste Disposal Form
- Keep the Hazardous Waste form near the waste container (arm's length)

Adding waste to the container

Before adding waste to the container, make sure it has been neutralized or treated such that it will not react with the other materials in the container or such that someone else may add to the container without risk of reactivity.

- Transfer material to the waste container in a hood or area that is aligned with the best practice related to the materials both in the bottle and for the material that you are disposing.
- DO NOT over fill the container. Leave 10% headspace.
- Record on the waste form, the date, the CAS number, the full name of the material including the concentration and co-solvent, record the amount and initial.
- Seal the container and inspect the area for leaks and spills, cleaning as needed
- Move the material to the stockroom or contact the physical plant for pick up when the bottle is 90% full, bottles will not be accepted above 90%.

Waste area inspection

- Inspect the area once per week, utilizing the University of Saint Thomas Waste Inspection Record
- Ensure the path to the waste area is clear, secure, access to the area is restricted and the waste inspection record is visible

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Emergency Contacts: 2-5555 on any phone. Colin Brownlow (EH&S), Chemistry Stockroom Personnel (Nick Honigschmidt and Sarah Fink: 2-5579) and Chemical Hygiene Officers (Gabriela Uzcategui-White and Peter Gittins).

A spill kit, emergency equipment and MSDS/SDS forms for all materials on site are located in the Chemistry Stockroom (OWS 485)

Disposal to Atmosphere

Disposal of liquids or discharge of hazardous vapors, gases, fumes and dusts to the atmosphere are not considered a disposal method. Laboratory hoods should not be used to evaporate materials from open chemical containers.

Waste Minimization

The environmental protection agency (EPA) has broad powers to enforce waste minimization based on the Hazardous Solid Waste Amendments of 1984. As a small quantity generator, the campus certifies they have made a good faith effort to minimize waste generation each time a manifest is signed.

It is important that all persons and departments generating hazardous waste consider how they can contribute to the waste minimization effort. The goal is to either prevent the formation or production of pollutants at the source or reduce the amount of hazardous waste that is generated.

Basic waste minimization options include:

- waste stream segregation
- good housekeeping
- inventory control/ordering chemicals in smaller containers
- material substitution
- using smaller scale
- modifying specific experiments

If you have (or will be doing) any of the above please contact a chemical hygiene officer so this information can be used to document campus commitment to waste minimization.

Special Wastes

Batteries

The campus is no longer allowed to place most batteries in the normal trash. Current policies on battery disposal apply only to businesses.

The following is a battery disposal guide for batteries generated by campus operations:

1. Alkaline Batteries

   Alkaline batteries include AAA, AA, A, C, D and 9 volt.

Disposal: Normal Trash

2. Lead Acid Batteries

   Lead acid batteries are found in autos, trucks, etc.

   Disposal: Do not place in normal trash. Exchange old battery for new one at dealer or contact the physical plant, for recycling.

3. Button Batteries

   Button batteries are found in watches, calculators, cameras and other small equipment. They can contain silver oxide, mercury, lithium or cadmium. These materials are considered hazardous waste. Contents can be determined by reading original battery packaging.

   Disposal: Do not place in normal trash. Either return to dealer, who sold the battery, for recycling (prior arrangement required) or contact Jill Fermanich, ext. 2273, for hazardous waste disposal. Button batteries can only be recycled if they are segregated on the basis of metal content. To facilitate this, try to get into the habit of keeping the original packaging to refer to once the battery is spent.

4. Lithium Batteries

   Lithium batteries are found in some electronic equipment. See original packaging for content information.

   Disposal: Do not place in normal trash. Either return to dealer, who sold the battery, for recycling (prior arrangement required) or contact Jill Fermanich, ext. 2273 for hazardous waste disposal. Keep lithium batteries separate from other batteries when collecting.

5. Nickel Cadmium (NiCad) Batteries

   NiCad batteries are found in items including medical equipment, pagers, and cellular telephones. Check original packaging for content information.

   Disposal: Do not place in normal trash. Complete a service request for recycling services to pick up. Keep NiCad batteries separate from other batteries when collecting.

Fluorescent Lamps

Fluorescent lamps contain small quantities of mercury and other metals that are harmful to the environment and to human health. If these lamps are burned or thrown into landfills, the mercury and lead in them can be released into the environment, where contamination problems may occur. The physical plant sends off campus for recycling:

- fluorescent lamps
- sodium-vapor lamps

- high- and low-pressure mercury vapor lamps
- high intensity discharge (HID) lamps

If your department generates any of the above lamps which should be sent out for recycling please create a service request via the physical plant. Avoid breakage of lamps. Similar to battery disposal policies, fluorescent lamp disposal requirements apply to businesses.

Infectious Waste

Infectious waste is regulated under the recently enacted Chapter NR 526, Medical Waste Management. A waste is considered to be an infectious waste if it falls in one of the following categories:

1. Sharps, as follows:

    a. Contaminated sharps which are both infectious and may easily cause punctures or cuts in the skin, including but not limited to: hypodermic needles, syringes with needles attached, scalpel blades, lancets, broken glass vials, broken rigid plastic vials and laboratory slides. Contaminated means they have come in contact with blood or other potentially infectious material.

    b. Unused or disinfected sharps which are being discarded, including hypodermic needles, scalpel blades, lancets and syringes with needles attached. Note: Only "contaminated" broken glass, plastic vials, laboratory slides, etc. are considered infectious waste. However, all discarded sharps (contaminated or not) such as hypodermic needles, scalpel blades, lancets and syringes with needles attached are considered infectious waste

2. Bulk blood and body fluids from humans. "Bulk blood and body fluids" means drippable or pourable quantities or items saturated with blood or other potentially infectious materials. In making this determination ask yourself whether blood or other potentially infectious material is drippable, squeezable, pourable or flakeable.

3. Human Tissue

4. Microbiological laboratory waste Note: Microbiological waste means cultures derived from clinical specimens or laboratory equipment which has come in contact with these cultures.

5. Tissue, bulk blood or body fluids from an animal which is carrying a zoonotic infectious agent.

Items that generally are not considered infectious waste include the following:

1. Items soiled but not saturate with blood of body fluids from humans (application of the drippable, squeezable, pourable, flakeable rule).

2. Tissue, blood, body fluids or cultures from an animal which is not known to be carrying or experimentally infected with a zoonotic infectious agent.

3. Animal manure and bedding.

Infections waste Treatment Options

The University of Saint Thomas policy is that all infectious waste including sharps be autoclaved then sent out for incineration. A suitable licensed vendor is contracted to handle the waste.

Collection and Handling

1. Infectious waste should be segregated and contained in an enclosed area until it is treated.

2. Sharps should be placed in a puncture-proof and leak-proof container with a sealable lid. The outside container must be labeled with a visible biohazard emblem (fluorescent orange background with contrasting color - typically black - biohazard symbol). Red sharps containers are commercially available.

3. Other infectious waste should be placed in an infectious waste bag (leak proof) with a biohazard label.

Photographic Waste

The dawn of digital technology has greatly reduced the production of photographic wastes. Generally, the waste created from the development of traditional films may be treated as non-hazardous. Since however, large quantities of Silver may be generated, it is advisable to treat the materials as hazardous waste and allow the physical plant personnel make the determination as to whether the materials be disposed as such.

Radioactive Waste

Radioactive waste cannot be disposed of via typical hazardous waste disposal options such as incineration. Very few sites will accept radioactive waste for disposal. As a result, disposing of radioactive waste is expensive. Before generating any radioactive waste, please contact Colin Brownlow to discuss disposal options and costs. In addition to potential waste disposal requirements, work with radioactive isotopes requires compliance with an NRC license and prior approval from Environmental Health and Safety's Radiation officer, Colin Brownlow.

Preparedness, prevention, records

Emergency Procedures - Chemical Spill or Release

When an accidental chemical spill or release occurs, the Saint Thomas employee on the scene (staff, instructor, researcher, laboratory technician, etc.) decides whether to treat the situation as a nonemergency chemical (simple) spill or as an emergency spill. Knowledge of the hazards associated with the spilled or released chemical is required to make this determination. An emergency is any immediate threat to personal safety and health, the environment, or property that cannot be controlled and corrected safely and easily by the individual at the scene. For this reason, it is the individual's responsibility to understand the information contained in the associated MSDS – SDS. A copy of all MSDS – SDS is available in the chemistry stockroom, OWS 485. Any spill involving materials with a Danger or Warning label or NFPA Fire, health or reactivity rating of 3 or higher or larger than one gallon or 2.5 liters of material is a required to be considered an emergency situation. Help should be contacted immediately from dialing 2-5555 or contacting the chemistry stockroom or a Chemical Hygiene Officer. For emergency spills, the area should be evacuated and Public Safety (2-5555) should be called for assistance.

A spill kit is available at the chemistry stockroom with additional supplies as needed and personal protective equipment.

If a spill or release is discovered by an Operations employee or an employee not familiar with the incident and a hazard evaluation cannot be made, the spill or release should be treated as an emergency. Call 2-5555. A person unfamiliar with a chemical substance and its hazards should not attempt any type of clean-up or containment.

After any spill, a near miss report should be filled with the Chemical Hygiene Officers to foster understanding, communication and develop any training or develop control measures. Forms can be found in the chemical hygiene plan (Appendix A) and should be available in the teaching labs and the chemistry stockroom.

The following section explains how to handle a nonemergency or simple spill or release in the laboratory.

A. Preplanning

1. A spill containment/clean-up plan should be established to handle chemicals you use in the laboratory. Consideration must be given to the maximum amount used and concentrations of chemicals. Materials or procedures that are listed as particularly hazardous are required to have a prior approval form submitted to the Chemical Hygiene Officers for approval and to assure the support staff that would help in the clean-up of a spill are trained in the clean-up should an incident occur. Examples of prior approval materials are: Benzene, Carbon Tetrachloride, known carcinogens etc…Familiarize yourself with spill clean up equipment available. If necessary obtain sufficient supplies to handle potential spills for your laboratory or the laboratory in which you are working.

You should also familiarize yourself with the locations of the fire alarms, fire extinguishers, telephones, eye washes and emergency showers.

2. The person causing a spill or release is responsible for clean up to the extent of his/her ability. Assistance may be available however, they are not responsible for clean up. Persons who work with chemicals are expected to know how to safely clean up spills of the chemicals in which they are using.

B. Simple Spill Clean up

1. Prevent the spread of dusts and vapors. If the substance is volatile or can produce airborne dusts, assure the laboratory door is closed and increase ventilation (through fume hoods, for example) to prevent the spread of dusts and vapors to other areas. All of the laboratory doors on campus are fire and security doors and should remained closed at all times.

2. Neutralize acids and bases if possible. Spills of most liquid acids or bases, once neutralized can be mopped up and rinsed down the drain (to the sanitary sewer). However, be careful because the neutralization process is often vigorous, causing splashes and yielding large amounts of heat and could volatilize any hazardous materials within the spill. Neutralize small acid spills with soda ash or sodium bicarbonate. Bases can be neutralized with citric acid or ascorbic acid. Use pH paper to determine when acid or base spills have been neutralized. Spills larger that described above should be absorbed into the materials contained within a spill kit to minimize the volatilization of materials. The absorbents purchased can neutralize the materials absorbed.

3. Control the spread of the liquid. Contain the spill. Make a dike around the outside edges of the spill. Use absorbent materials such as cat litter, or spill pillows.

4. Absorb the liquid. Add absorbents to the spill, working from the spill's outer edges toward the center. Absorbent materials, such as cat litter are relatively inexpensive and work well, although they are messy. Spill pillows are not as messy as other absorbents, but they are more expensive. Note that special absorbents are required for chemicals such as hydrofluoric and concentrated sulfuric acids. Cat litter and spill pillows are available in the chemistry stockroom.

5. Collect and contain the cleanup residues. The neutralized spill residue or absorbent should be scooped, swept, or otherwise placed into a plastic bucket or other container. For dry powders or liquids absorbed to dryness, double bag the residue using plastic bags. Additional packaging may be required before the wastes can be transported from your laboratory. Be sure to label containers.

6. Dispose of the wastes. Keep cleanup materials separate from normal trash. Contact a chemical hygiene officer or the chemistry stockroom for guidance in packaging and labeling cleanup residues. Promptly place cleanup wastes in an appropriate hazardous waste receptacle.

7. Decontaminate the area and affected equipment. Ventilating the spill area may be necessary. Open windows or use a fan unless the area is under negative pressure. In some instances, your environmental health and safety officer can test the air to ensure that hazardous vapors are gone. For most spills, conventional cleaning products, applied with a mop or sponge, will provide adequate decontamination.

For extremely large spills or spills of hazardous materials, the University has contracted an external vendor. Calling for assistance and communication of the hazard will trigger the automatic evaluation of need for this assistance.

C. Special Precautions

1. Flammable liquids.

Remove all potential sources of ignition. Vapors are what actually burn, and they tend to accumulate near the ground. Flammable liquids are best removed though the use of spill pillows or pads. Spill pads backed with a vapor barrier are available in the chemistry stockroom. Because flammable liquids will probably be incinerated, avoid using inert absorbents such as cat litter. All used absorbent materials should be placed in heavy-duty poly bags, which are then sealed, labeled, and disposed through your facility's hazardous waste management program. Before resuming work, make sure the spill has been adequately ventilated to remove flammable vapors.

2. Volatile Toxic Compounds.

Use appropriate absorbent material to control the extent of the spill. Spill pillows or similar absorbent material usually work best because they do not have the dust associated with cat litter. Place all used absorbent materials in heavy-duty poly bags. Seal the bags, label them and hand them over to the chemistry stockroom. Again, make sure the spill area has been adequately ventilated before resuming work.

3. Direct Contact Hazards.

Carefully select suitable personal protective equipment. Make sure all skin surfaces are covered and that the gloves you use protect against the hazards posed by the spilled chemical. Often it is a good idea to wear two sets of gloves: one as the primary barrier, the second as a thin inner liner in the event the primary barrier fails. When the cleanup is complete, be sure to wash hands and other potentially affected skin surfaces.

4. Mercury Spills.

Mercury spills rarely present an imminent hazard unless the spill occurs in an area with extremely poor ventilation. The main exposure route of mercury is via vapor inhalation. Consequently, if metallic mercury is not cleaned up adequately, the tiny droplets remaining in surface cracks and crevices may yield toxic vapors for years. Contact the

chemistry stockroom and or the chemical hygiene officers for assistance and retrieve the mercury spill kit.

When a mercury spill occurs, first cordon off the spill area to prevent people from inadvertently tracking the contamination over a much larger area. Generally, a special mercury vacuum cleaner provides the best method of mercury spill cleanup. Do not use a regular vacuum cleaner, because you will only disperse toxic vapors into the air and contaminate your vacuum cleaner. If a special mercury vacuum is not available, first use an appropriate suction device to collect the big droplets, then use a special absorbent to amalgamate small mercury droplets.

D. Signage and labeling

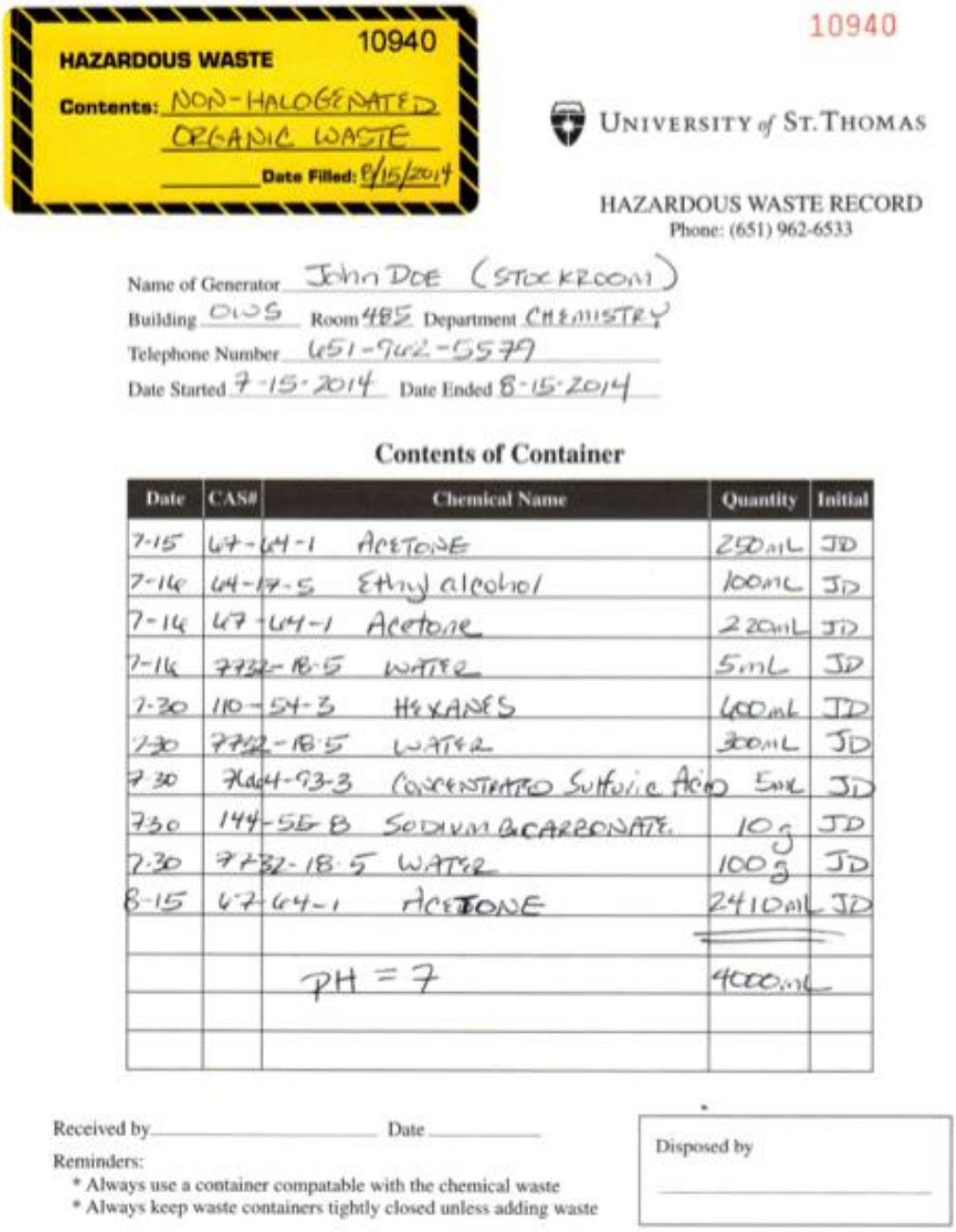
Many times during the usage of chemicals, the length of the procedure requires that you not be present in the vicinity of the procedure, ie teaching a class, going to lunch, ending the work day. For this reason, times where the materials are out of your control, all reactions and procedures involving chemicals must be labeled appropriately. Reaction vessels must have a label referring to the notebook page where the materials are written and bottles containing chemicals must be labeled according the Global Harmonized system. Reactions where known risks are present, require additional documentation visibly posted. Overnight water usage require an afterhours unattended sign so that safety officers know to check for water leaks. All reactions using cyanide, require a cyanide in use sign be placed on the door and the chemistry stockroom and principle investigators permission. All sources of cyanide must be located and dispensed through the chemistry stockroom. Bio-hazard level 2 or above require external signage. Use of allergens such as tin, cephalosporins and sulfa-antibiotics require external signage. It is the principle investigators responsibility to evaluate when additional signage is needed.

E. Documentation

Report all hazardous waste spill incidents to the chemical hygiene officers, Gabriela Uzcategui-White or Peter Gittins. Major incidents are almost always preceded by numerous near misses.

Appendix A:

Hazardous Waste Form:



HAZARDOUS WASTE 10940

Contents: NON-HALOGENATED ORGANIC WASTE

Date Filled: 8/15/2014

10940

UNIVERSITY of ST. THOMAS

HAZARDOUS WASTE RECORD

Phone: (651) 962-6533

Name of Generator John DOE (STOCKROOM)

Building OWS Room 485 Department CHEMISTRY

Telephone Number 651-962-5579

Date Started 7-15-2014 Date Ended 8-15-2014

Contents of Container

Date	CAS#	Chemical Name	Quantity	Initial
7-15	67-64-1	ACETONE	250mL	JD
7-16	64-17-5	Ethyl alcohol	100mL	JD
7-16	67-64-1	Acetone	220mL	JD
7-16	7732-18-5	WATER	5mL	JD
7-30	110-54-3	HEXANES	600mL	JD
7-30	7732-18-5	WATER	300mL	JD
7-30	7664-93-3	CONCENTRATED Sulfuric Acid	5mL	JD
7-30	144-55-8	SODIUM BICARBONATE	10g	JD
7-30	7732-18-5	WATER	100g	JD
8-15	67-64-1	ACETONE	2410mL	JD
		pH = 7	4000mL	

Received by _____ Date _____

Reminders:

* Always use a container compatable with the chemical waste
* Always keep waste containers tightly closed unless adding waste

Disposed by _____

- CAS #: Chemical Abstracts Service Numbers can be found on the MSDS – SDS or on the bottle of the material in which you are using. Google is also a great source.

- Note the pH has been documented as well as the total volume in the container. The yellow sticker should be on the container while the table is being created.

Hazardous Waste Area Inspection Record:

January 2013

UNIVERSITY OF ST. THOMAS
HAZARDOUS WASTE STORAGE AREA INSPECTION RECORD

This is a record of the weekly inspection of what area?
OWS 485 - Organic Hood

As of the date signed, the above area has been inspected for compliance with Hazardous Waste Storage Rules. The following items have been inspected.

1. All containers are labeled with the words "Hazardous Waste" and the contents of the container.
2. All containers are closed.
3. All containers are free of leaks or other deterioration.
4. All containers are appropriate and compatible with the waste.

DATE	"OK" or Notes	SIGNATURE
1-2-2013	OK	
1-7-2013	OK	
1-14-2013	OK	
1-22-2013	OK	
1-28-2013	OK	
2-4-2013	OK	
2-11-2013	OK	
2-18-2013	OK	
2-26-2013	OK	
3-4-2013	OK	
3-11-2013	OK	
3-19-2013	OK	
4-3-2013	OK	
4-8-2013	OK	
4-15-2013	OK	
4-26-2013	OK	
4-30-2013	OK	
5-13-2013	OK	
5-20-2013	OK	
5-28-2013	OK	
6-3-2013	OK	
6-10-2013	OK	
6-17-2013	OK	
6-24-2013	OK	
7-1-2013	OK	
7-15-2013	OK	
7-22-2013	OK	
8-7-2013	Empty OK	

DATE	"OK" or Notes	SIGNATURE
8-12-2013	OK	
8-19-2013	OK	
8-29-2013	OK	
9-10-2013	OK	
9-16-2013	OK	
9-23-2013	OK	
9-30-2013	OK	
10-7-2013	OK	
10-21-2013	OK	
10-28-2013	OK	
11-26-2013	OK	
12-9-2013	OK	

Incident Investigation Guidelines and Incident Report:

Incident Investigation

The faculty or staff member with responsibility for the management of a laboratory shall investigate any chemical release, personal injury or chemical exposure, and property damage incident in their laboratory. The investigation will include interviews of employees involved in the incident, a sketch or photograph of the incident location, identity of any chemicals, substances, biological or physical agents involved and a description of the procedure (if any) being performed. The investigator will attempt to determine factors which contributed to the occurrence and severity of the incident and will make recommendations to prevent or reduce the severity of future incidents.

Any faculty or staff member required to perform an incident investigation can contact the Laboratory Safety Officer for guidance and assistance in completing the investigation.

Incident investigations are to be documented on the Accident/Incident Investigation Report. Additional information such as witness statements, sketches, photographs, chemical or equipment information can be attached to the Accident/Incident Investigation Report.

Incident Review by Laboratory Safety Committee

The Department Chair and Laboratory Safety Officer will review all Accident/Incident Report and attached documentation. They will convene the Laboratory Safety Committee to review all personal injury incidents, all major chemical spill and release incidents and any other incidents they feel would benefit from review. The Laboratory Safety Committee will:

- Review the circumstances of an incident.
- Review the Accident/Incident Report.
- Interview involved employees and other witnesses.
- Review the initial investigators findings and recommendations.
- As necessary, revise or develop additional findings and recommendations.
- Make recommendations for revision or development of new procedures and revision of the Laboratory Safety Manual.

The Laboratory Safety Manager will develop a summary of the Laboratory Safety Committee's review, findings and recommendations which will be provided via e-mail to all laboratory employees.

University of Saint Thomas Chemistry Department
Incident Report Form

Date of Incident: mm / dd / yyyy
Personnel Involved (include student names):

Location of Incident:

Description of Response / Treatment:

Cause of Incident if Kown:

Name of Person Submitting Report: _____

Signature: _____ Date: mm / dd / yyyy

University of Saint Thomas
Hazardous Waste Training

Once you have read the hazardous waste training document. Please complete the form below and sign to certify that you have read and understood this document. Completed forms should be sent to Kathey Goodwin (OWS 402) for record keeping.

Name:_____

Date of Completion: ____/____/____