Dickinson

COMPREHENSIVE WASTE MANAGEMENT PROGRAM

March 15, 2017

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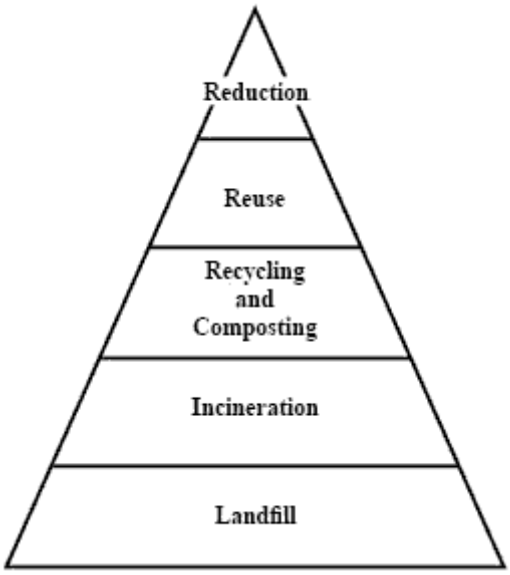
Review/Revision Summary

Below is a summary of reviews and revisions made to this document:

Review/Revision Date	Major Changes	Reviewed/Revised By:
3/10/2008	Original Document	Bill Shoemaker, EHS Director
3/15/2017	• Changed Titles • Updated Waste Oil Procedures (outside of Facilities Management) • Replaced Yellow Accumulation Card (Appendix A) with "How to fill out a waste label" • Added Appendix B – Disposal Guidance Posters • Removed EPA List of Listed Wastes – link provided to list on EHS Website	Steph Koser, WasteStrategies

I. Introduction

According to the United States Environmental Protection Agency (EPA), during the past 35 years, the amount of waste each person creates has doubled from 2.7 to 4.4 pounds per day. While most solid waste professionals agree that disposal to landfills will always be needed, they also realize that reductions in waste generation must occur. Modern waste management programs encourage use of reduction, reuse, and recovery strategies before disposal to landfills.



The strategy used to develop a comprehensive waste management program is to identify the level or levels at which the highest values of individual and collective materials can be recovered. For this reason, the list starts with reduction—using less, thereby saving material production, resource cost, and energy. Examples of reduction at Dickinson College include the use of Energy Star compliant computer systems where possible; energy star appliances in student rooms; lower winter temperature and higher summer temperature set points; limiting free paper use for students and implementing a print management system for employees; water saving wash machines and urinals; shuttle services; and the Dickinson Rides Red Bike program.

Reuse is using a product more than once, either for the same purpose or for an alternate purpose. Reuse does not require reprocessing and, therefore, has lower energy requirements than recycling. Examples of reuse at Dickinson College include donations of college furniture to local organizations, reusing ink and toner cartridges, reusable Ecotainers, and the U-turn program which collects used items from students at the end of the academic year and auctions them to local residents.

Recovery is recapturing the material or energy of the item at its highest point. Recovery includes recycling, composting, and incineration. In recycling, waste materials are processed industrially and then reformed into new or similar product. Although recycling is often viewed as a resource conservation activity, it may offer greater return for many products in terms of energy savings. Dickinson College has an extensive and growing recycling program. This program includes recycling of plastics (#1-7), aluminum cans, glass, paper, paperboard, cardboard, batteries, printer cartridges, tires, motor oil, fluorescent lights, scrap metal, computers and other electronics. Dickinson College also produces biodiesel from used cooking oil and soap from the glycerin byproduct in its biodiesel production facility. In order to make recycling economically feasible, Dickinson College uses green and recycled materials when possible.

Composting recaptures value through the natural biodegradation process. The predominant use of composting programs in the United States is for food and yard wastes. Dickinson College composts yard wastes and organic materials collected from Dining Services and glycerin from its biodiesel production facility.

The third approach to recovery is to incinerate waste and use the heat for energy. Incineration reduces the volume of waste by up to 90 percent, leaving behind only ash, and resulting in less need for landfill space. Examples at Dickinson College include incineration of flammable liquids at TSDFs and incineration of waste oil in furnaces for heating on premises.

The last option is disposal. Given current technology, there are residuals from the previous processes, and some materials are simply not recoverable and must go somewhere. Currently in the United States, 32% is recovered and recycled or composted, 14% is incinerated, and the remaining 54% is disposed of in landfills. As society moves waste to the forefront of public policy, it is more apparent that what we discard annually contains a multitude of valuable and recoverable materials. This comprehensive waste management program will assist in the careful analysis of what is in the waste stream and offer ways to recover materials and energy at the point of highest value.

II. Purpose

The purpose of this program is to assure that all waste generated on campus is properly managed with the least impact on environmental resources. This includes:

1. Identifying the source of all waste streams and assigning a responsible person to manage each waste stream.
2. Evaluating all waste streams to determine their proper characterization
3. Establishing waste management procedures for each waste stream, and

4. Developing waste minimization strategies, thereby saving matter and energy

III. Responsibility

A. This program is administered jointly under the authority of the **Associate VP for Facilities Management** and the **Director of Compliance & Enterprise Risk Management**.

B. The **Department of Compliance & Enterprise Risk Management** is responsible for ensuring that all hazardous and universal wastes and waste oil are managed in accordance with federal, state, and local regulations. Additionally, the Department provides technical assistance and guidance to the College community on proper handling, storage, and disposal of these wastes.

C. The **Department of Grounds & Landscaping** is responsible for ensuring that all non-hazardous municipal and residual wastes are managed in accordance with federal, state, and local regulations. Additionally, the Department provides technical assistance and guidance to the College community on proper handling, storage, and disposal of these wastes.

D. The **Department of Library and Information Services** is responsible for ensuring that all E-wastes are managed in accordance with federal, state, and local regulations. Additionally, the Department provides technical assistance and guidance to the College community on proper handling, storage, and disposal of these wastes.

E. **All Employees** are responsible for ensuring that waste is properly managed in accordance with this plan. Failure to follow procedures and practices outlined in the Comprehensive Waste Management Plan 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, administration, or staff.

IV. Availability

The Dickinson College Comprehensive Waste Management Plan must be readily available to all employees through their supervisor. Employees are to be advised of the availability of the plan during their education/training sessions. Although it is not necessary for each employee to have an individual copy, an electronic copy can be found on the Environmental Health & Safety website.

V. Plan Review

The Dickinson College Comprehensive Waste Management Program will be reviewed and updated:

1. periodically by the Director of Compliance & Enterprise Risk Management to assure that departments are complying with the requirements of the existing program and that all existing programs are adequate based on current laws
2. when new waste streams are created
3. to reflect changes in technology that reduce, reuse, or recover materials or energy

VI. Applicability

Currently regulated wastes are generated in the following areas, under the terms of Section VII of this program. Departments and responsible parties are indicated: the responsible party is the individual who holds the listed position or any successor position.

Department	Responsible Person	Chemical	Biological	Radiological	Controlled Substances	Universal Waste	Waste Oil	Scrap Electronics
Art & Art History	Chairperson	X						
Athletics	Director	X	X					
Biology	Chairperson	X	X	X	X	X	X	
Chemistry	Chairperson	X	X	X		X	X	
Dining	Director	X	X				X	
Environmental Sciences/Studies	Chairperson	X						
Facilities	Director	X	X			X	X	
Farm	Director	X				X	X	
Geology	Chairperson	X						
Health Services	Director	X	X		X			

Department	Responsible Person	Chemical	Biological	Radiological	Controlled Substances	Universal Waste	Waste Oil	Scrap Electronics
Library & Information Services	Director							X
Physics	Chairperson	X		X			X	
Psychology	Chairperson	X	X		X			
Public Safety	Director		X					
Theatre Arts	Chairperson	X						

VII. Waste Determination and Management

A. Hazardous Waste (Chemical, Biological, Radiological)

Disposal requests for chemical, biological wastes, and radiological waste can be made by contacting the Director of Compliance & Enterprise Risk Management at 245-1495. Please be prepared to provide information on the type and amount of waste, location of waste, department, and contact name/phone number of the waste generator. This can best be accomplished by completing a yellow waste accumulation label (Appendix A).

Chemical Waste

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 (current list can be found on the EHS website at http://www.dickinson.edu/homepage/839/environmental_health_and_safety), while others are not listed by the EPA but contain one or more of the EPA's four (4) hazardous characteristics: ignitability, corrosivity, reactivity, and toxicity. The following briefly describes the storage and disposal process for chemical waste:

1) Individual generators are responsible for the safe collection and storage of hazardous waste at their site. These satellite storage sites may accumulate up to 55 gallons of hazardous waste (U-list) or one quart of acutely hazardous waste (P-list) in compatible containers provided that the container is marked

with an accumulation start date, the words “Hazardous Waste”, and with the contents of the container identified.

2) Hazardous wastes are segregated into waste streams using waste accumulation labels (See Appendix A & B).

3) Waste stored at the point of generation should be kept to a minimum. Containers must be kept closed and dated when they become full and moved to the hazardous waste accumulation area. The waste accumulation area must be inspected weekly and waste must be removed from the accumulation area at least every 180 days, generally during the mid-semester break and after the summer research session.

4) 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 transporters.

Biohazardous Waste

Biohazardous waste describes different types of waste that might include infectious agents. The following briefly describes the storage and disposal process for biohazardous waste:

1) Animal parts or whole animals should be placed in biohazard waste bags for incineration.

2) If animal tissue is held in liquid preservative, the tissue and liquid preservative should be separated. The animal tissue should be placed in biohazard waste bags for incineration. The preservative should be disposed of as a chemical waste.

3) Liquid culture waste can be decontaminated using an autoclave. If the material cannot be decontaminated, it should be placed in biohazard waste bags for incineration.

4) All other medical/pathological/regulated waste should be placed in biohazardous waste bags for disposal.

Radioactive Waste

1) Short-lived RAM Solid Waste

    Short-lived RAM solid waste shall be segregated by isotope and placed into a labeled suitably shielded compatible container for decay-in-storage. After the activity decays to background levels as determined by survey

with a meter (at least 10 half-lives), the decayed waste may be disposed of as regular trash after all labels denoting radioactivity have been removed.

2) Long-lived RAM Solid Waste

   Long-lived RAM solid waste shall be segregated by isotope and placed into a labeled suitably shielded compatible container. Disposal of this low-level radioactive waste will be contracted through a qualified vendor.

3) Short-lived RAM Liquid Waste

   Aqueous liquids containing RAM shall be disposed of down a dedicated sink with a large volume of water sufficient to keep the sink drain flushed clean of RAM. The quantity disposed shall not exceed 1 mCi/day and 5 mCi/quarter.

   Compliance with NRC release limits is monitored on a college level using RAM inventory and sewer release volume.

   Non-aqueous/hazardous chemical liquids containing short-lived RAM (half-life <120 days) must be held until after the activity decays to background levels as determined by survey with a meter (at least 10 half-lives). The decayed waste shall then be disposed of as chemical waste after all labels denoting radioactivity have been removed.

4) Long-lived RAM Liquid Waste

   Non-aqueous/hazardous chemical liquids containing long-lived RAM (half-life > 120 days) are known as "mixed" waste. If your research will produce this kind of waste, you should discuss this with the RSO immediately.

5) Preparing Radioactive Waste for Disposal

   The generator shall provide the following information on each container of radioactive waste:

   - Label reading, "Radioactive Waste"
   - Authorized User's name
   - Generation Date
   - Isotope
   - Reference Date
   - Activity (µCi or mCi)

- Survey Instrument Used
- Chemical Names/Hazards

B. Controlled Substances

The United States Drug Enforcement Agency (DEA) issues permits for controlled substances. The following briefly describes the storage and disposal of controlled substances.

A. Abandonment of a controlled substance is a violation of the DEA permit under which it is held.

B. Permission to transfer ownership of a controlled substance must be received from the DEA.

C. Controlled substances being held by a licensed individual and to be surrendered for destruction must be inventoried on DEA Form 41 and mailed to the Drug Enforcement Administration.

C. Universal Waste

Disposal requests for universal wastes can be made by contacting the Facilities Department by submitting a work order. When contacting facilities, be prepared to provide information on the type and amount of waste, location of waste, department, and contact name/phone number of the waste generator. Certain types of universal wastes, such as batteries, bulbs, etc., can be taken to collection points around campus.

Universal wastes are certain hazardous wastes that are generated by a large cross section of the regulated community. Universal wastes are generally more innocuous than other hazardous wastes and management of these wastes as universal wastes is less onerous than normal hazardous waste management, and facilitates the increased recycling of these wastes. Universal waste management does not require the use of a manifest or a licensed transporter to transport the waste to a permitted TSDF. More importantly, management as universal waste allows facilities that meet "universal waste handler" requirements to accumulate these wastes without a full hazardous waste storage permit. Pennsylvania has incorporated as universal waste the wastes designated by EPA as universal waste—hazardous waste lamps, mercury thermostats, agricultural chemicals under a manufacturers recall or collection program and batteries. In addition Pennsylvania also classifies "mercury-containing devices" as universal wastes. Management of hazardous wastes under the universal waste program is less costly than management under full hazardous waste regulation. Lower transportation

and accumulation costs help to increase the recycling of universal wastes, and also helps to divert them from unlawful disposal in non-hazardous waste landfills. Not all batteries, lamps, or pesticides are hazardous waste and therefore may not have to be treated as universal waste. The following briefly describes the storage and disposal process for universal waste:

1) Containers must be kept closed, remain structurally sound, and be compatible with the contents.
2) Containers must be properly labeled and should read:

   "Universal Waste – Battery (ies)"
   "Universal Waste – Pesticide(s)"
   "Universal Waste – Mercury Thermostat(s)"
   "Universal Waste – Lamp(s)"
   "Universal Waste – Mercury Containing Device(s)"
3) Waste must contain an accumulation start date and be removed from campus within one year.
4) Waste may be sent to a TSDF, another handler of universal waste, or a recycler.
5) Employees must be informed by training of their responsibilities for managing the waste and how to respond to a release.
6) Waste can be stored at satellite or accumulation areas for the entire time. It is recommended to store it in the accumulation area for the purpose of dating and removal within one year.

Universal Waste -- Batteries

1) Lead acid batteries can be collected, transported, and stored prior to shipping off-site for reclamation without regulation. They can also be managed as Universal Waste.
2) Batteries can be sorted by type and discharged, but it is not required—they can be mixed in one container.
3) Battery collections sites can be found in the Holland Union Building and many residence halls.

Universal Waste -- Pesticides

1) Waste pesticides can be treated as "Universal Waste – Pesticides" when they are recalled or when they are unused pesticides to be disposed of.

2) Pesticides must contain the original label supplied by the manufacturer, an appropriate DOT label, or a label approved by the pesticide collection program.

Universal Waste -- Lamps

1) Lamps MAY NOT be crushed.
2) Lamps must be contained in packages that are adequate to prevent breakage (use shipping carton).
3) Some manufacturers make fluorescent lamps that contain less than the regulated level of mercury. You may want to check out our current supplier. Get manufacturer confirmation **in writing** before discarding as non-hazardous solid waste.

Universal Waste -- Mercury-Containing Devices

The Pennsylvania Department of Environmental Protection (DEP) allows all mercury-containing devices to be treated as universal waste—not just lamps and thermostats. This would include thermometers, manometers, elemental mercury, etc. …But NOT Mercury debris.

1) Do not remove mercury ampules from thermostats.
2) Excludes mercury containing batteries.

D. Waste Oil

Disposal requests for waste oil outside of Facilities Management can be made by contacting the Department of Compliance & Enterprise Risk Management. When contacting The Department of Compliance & Enterprise Risk Management, be prepared to provide information on the type and amount of waste oil, location of waste oil, department, and contact name/phone number of the waste generator.

VIII. Used Oil

Used oil is exactly what its name implies, any petroleum-based or synthetic that has been used. It may contain brake fluid, transmission fluid, or power steering fluid but not antifreeze or windshield washing fluid. The following briefly describes the storage and disposal process for universal waste:

1) EPA and DEP presume that used oil is to be recycled.

"Off-Spec" USED OIL – Can be recycled as a fuel if it has not been mixed with a listed or characteristic waste (see section A above), even if the oil itself has a

hazardous waste characteristic as a result of use in a process (except for having As, Cd, Cr, Pb, flash point < 100F, Total halogens > 1000 ppm).

2) Used oil to be burned for energy recovery must have at least 8000 Btus per pound.

3) Containers storing used oil must be marked "WASTE OIL" according to PA DEP.

4) Dickinson College as a generator may transport no more than 54 gallons of used oil in a company owned vehicle to an aggregation point. It can, however, offer that oil to transporters who have notified the EPA of their used oil management activities, have an EPA ID#, and will burn the oil in an industrial furnace, industrial or utility boiler, or a permitted incinerator.

5) If a transporter is used, they must have a log book or a bill of lading with the used oil shipment. It must include:

   Name, address, EPA ID# of Dickinson College

   Quantity of used oil accepted

   Date of acceptance

   Signature of Dickinson College representative

Used Oil Filters – Must be treated as hazardous waste unless they have been gravity hot drained (in which case they can be recycled or discarded) and are NOT terne plated.

Oily Rags – Materials from which used oil has been drained to the extent possible and from which no free flowing oil remains, provided they are not burned for energy recovery are not regulated. This means oily rags can be treated as solid waste if no free flowing oil remains.

IX. Municipal and Residential Waste

Disposal requests for municipal and residual wastes can be made by contacting the Facilities Department through the work order system. When contacting facilities, be prepared to provide information on the type and amount of waste, location of waste, department, and contact name/phone number of the waste generator.

Municipal wastes—more commonly known as trash or garbage—consist of everyday items such as product packaging, grass clippings, furniture, clothing, bottles, food scraps, newspapers, and appliances. Under the Resource Conservation and Recovery Act (RCRA), landfills that accept municipal waste are primarily regulated by state, tribal, and local governments. EPA, however, has established national standards these landfills must

meet in order to stay open. Municipal landfills can, however, accept household hazardous waste.

Household hazardous wastes include many commonly discarded items such as paint, cleaners, oils, batteries, and pesticides that contain hazardous components. These products, if mishandled, can be dangerous to your health and the environment. Dickinson College through its sustainability programs tries to remove these materials from municipal waste generated by its residents.

Residual wastes are non-hazardous industrial waste including contaminated soil, ceramics, gypsum board, linoleum, leather, rubber, textiles, glass, industrial equipment, electronics, pumps, piping, storage tanks, filters, fertilizers, pesticides, detergents and cleaners, photographic film and paper; wastes containing asbestos, oil and PCBs; metal containing wastes such as foundry sands, slags, grindings and shavings; and residues such as sludge from treatment of public water supplies, emission control, lime-stabilized pickle liquor, paints, electroplating, and waste from the manufacture of lime and cement. As the examples indicate, residual waste is highly diversified, both in type and in its potential to harm public health and the environment when improperly managed. Some residual waste components, such as food processing wastes, present relatively little risk. Others, such as some metal-containing wastes, present a high degree of risk. Residual waste does not include materials defined by law as hazardous. However, it does include "near hazardous" wastes that are not covered by hazardous waste regulations. If not processed and/or disposed of properly, these wastes can cause significant environmental harm and health problems. Over 900 facilities in Pennsylvania have permits to process, beneficially use, or dispose of residual waste. In addition, almost all municipal waste landfills and resource recovery facilities accept residual waste. When possible, Dickinson College sends its residual waste to facilities where it can be processed, beneficially used, or disposed of rather than to a municipal waste landfill.

X. Scrap Electronics

Disposal requests for electronic wastes can be made by contacting Library & Information Services at 245-1000 or by submitting a HelpDesk Request at helpdesk@dickinson.edu. When contacting the HelpDesk, be prepared to provide information on the type and amount of waste, location of waste, department, and contact name/phone number of the waste generator.

The Library & Information Services Department manages the disposal of scrap electronics for the College. Scrap electronics includes CPUs, monitors, keyboards, mice, printers, televisions, telephones, or other electronic devices that contain a circuit board. These items are not specifically required to be managed as regulated waste; however, due

to the lead content of printed circuitry, and the potential for other hazardous materials in electronics devices, scrap electronics must not be disposed in the municipal waste stream.

XI. Training

All employees with regulated waste management responsibilities will be provided training by the Department of Compliance & Enterprise Risk Management in accordance with federal, state, and local laws. Refresher training will be provided as required by law or as indicated by plan review.

XII. Record Keeping

A. Hazardous Waste Characterizations, Tests, and Analysis

Waste characterizations, test results, and waste analyses must be retained for three years from the date the waste was sent to the TSDF.

B. Hazardous Waste Manifests and Land Disposal Restrictions

Hazardous waste manifests and land disposal restrictions must be retained for three years from the date the waste was transported to the TSDF.

C. Non-Hazardous Bills of Lading

Universal and residual wastes, unless managed as hazardous waste, do not require a manifest under 40 CFR Part 262. Bills of lading should be retained for three years from the date the waste was transported off-site.

D. Accumulation Area Inspections

Accumulation site inspection logs must be retained for three years from the date waste was transported off-site.

E. Daily Operational Records

Daily operation records including waste origin, transporter, transfer facility, final waste destination, weight or volume of waste, any handling problems, and emergency disposal activities must be retained for three years.

F. Training Records

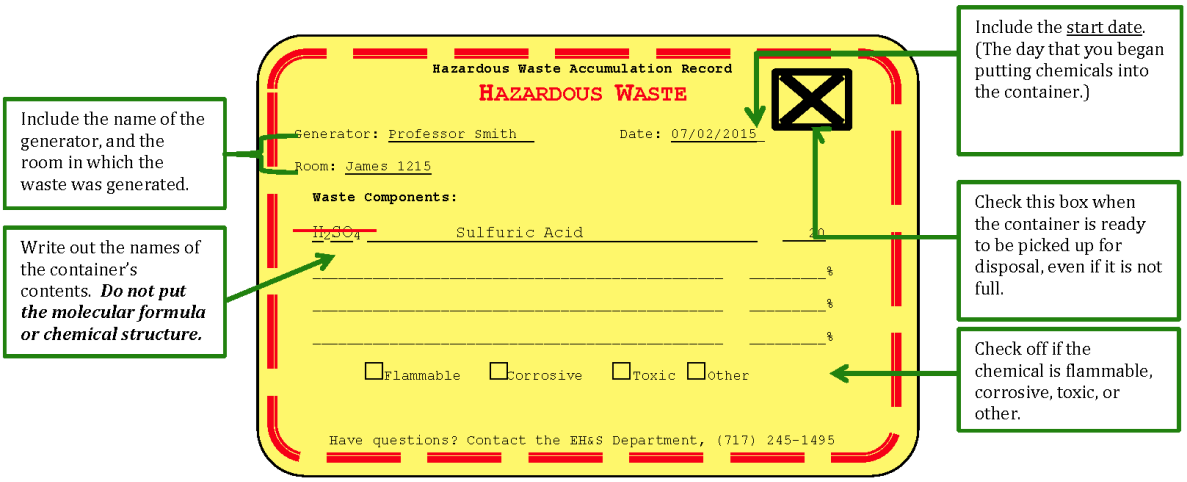
Dickinson College shall retain a record of each employee's training for the duration of the employee's employment.

G. Medical Records

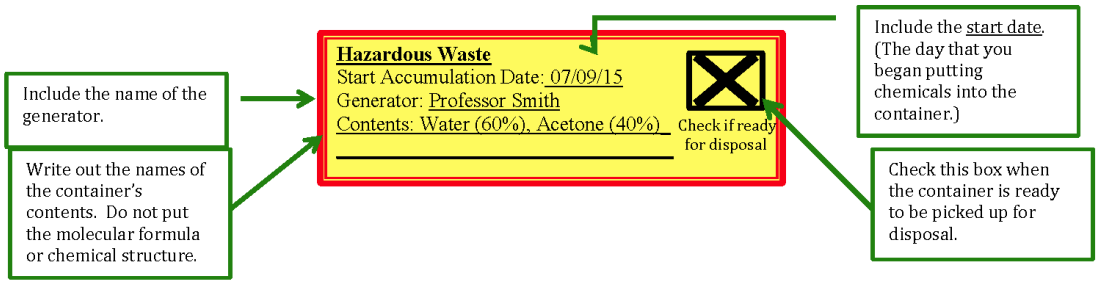
Medical certifications of CDL drivers must be retained for at least 30 years after termination of employment from the College

Appendix A: How to Fill Out Hazardous Waste Labels

How to Fill out Hazardous Waste Labels



There are two different sizes of hazardous waste labels. The small waste labels (below) should be used when the larger size is too big to fit on the chemical container.



Appendix B: Waste Guidance Posters

Dickinson

Laboratory Waste Disposal Guide

Chemical Waste Classes

Do NOT Mix Classes—Keep each category separate

Inorganic Acids Examples: Hydrochloric Acid (HCl) Sulfuric Acid (H_2SO_4) Ferric Chloride ($FeCl_3$) Copper Sulfate ($CuSO_4$)	**Organic Acids** Examples: Acetic Formic Trichloroacetic Acetic Anhydride	**Oxidizing Acids** Examples: Perchloric Nitric Chromic
Bases, liquids and solids Examples: Hydroxides Phosphates Ammonia (NH_3)	**Flammable Bases** Examples: Trimethylamine Trimethylchlorosilane	**Flammable Liquids** Examples: Acetone Toluene Acetonitrile Methanol Ethyl Acetate Heptane Hexane Oil based paint
Compressed Gas and Aerosols Examples: Compressed gas cylinders Aerosol Cans	**Toxic Organic** Examples: Non-flammable chlorinated solvents Pesticides Ethidium Bromide Acrylamide Chloroform Methylene Chloride Formaldehyde Phenol	**Toxic Inorganic** Examples: Mercury Lead Zinc Sodium Azide
Air/Water Reactive Examples: Grignard reagents Alkali metals Reactive halides (acetyl chloride) Sodium borohydride	**Oxidizers** Examples: All nitrates Potassium Dichromate Metal Peroxides	**Organic Peroxides** Examples: Benzoyl peroxide Methyl Ethyl Ketone peroxide
High Hazards Peroxide Formers Examples: Aged Ether Tetrahydrofuran 1,4-dioxane Di– and tri-nitro compounds	**Nonhazardous Waste**	See ***How to Fill out Hazardous Waste Labels*** poster for instructions on how to fill out the hazardous waste label Have questions? Need labels? Contact the Dept. of Compliance & Enterprise Risk Management at 717-245-1495

Helpful Advice:

- Enter information on tag as waste is added to the container.
- Keep waste in closed (sealed) containers.
- Do not put solid waste material (paper, plastic, etc…) into liquid waste containers.
- Do not mix incompatible chemicals in the same container.
- Do not put corrosive chemicals in metal containers.
- Do not overfill containers. Prevent leakage by leaving empty space at the top of the container.
- Clean visible contamination from the outside of the container.
- Place leaking waste containers in a secondary container and contact Compliance & Enterprise Risk Management as soon as possible for disposal.
- Leave tagged containers in a visible place.
- Refer to the Dickinson College Chemical Hygiene Plan and Comprehensive Waste Management Plan for further guidance.