



CHEMICAL WASTE MANAGEMENT GUIDE

Northern Illinois University

*Environmental Health and Safety Department
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Part 1: Overview of Chemical Waste Laws and Regulations

The Chemical Waste Management Guide establishes policies and procedures for the handling, storage and disposal of hazardous chemical waste at Northern Illinois University (NIU). The University is committed to maintaining compliance with all applicable laws concerning hazardous waste.

The Environmental Health and Safety Department (EHS) is the service unit of the University which is responsible for transportation, storage and disposal of hazardous waste. Questions regarding the classification, storage and disposal of chemical waste should be directed to the Environmental Protection Specialist at EHS. Policies and procedures for handling hazardous chemicals in academia are developed in conjunction with the Office of Research Compliance, Integrity and Safety (ORCIS).

There are many different laws and regulations which govern the management of chemical waste at NIU. Various laws have been passed at the federal, state and local governmental levels. It should be remembered that *any* applicable laws and regulations can be the basis for a regulatory citation. The purchase and use of any hazardous chemical carries with it the responsibility to be aware of the regulations governing its use and disposal.

1.1 Laws

1.1.1 Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act (RCRA), also known as the "Solid Waste" Disposal Act, was passed in 1976. This law empowered the United States Environmental Protection Agency (EPA) to establish regulations that govern the disposal of solid and hazardous waste in the United States. In Illinois, the enforcing agency is the Illinois Environmental Protection Agency (IEPA). RCRA regulations that apply in Illinois can be found in the Illinois Administrative Code (IAC), Title 35, Subtitle G, Parts 720-729.

A solid waste is defined by RCRA in 35 IAC 721.101 as any discarded waste. This broad definition of solid waste includes any solid, liquid or gas which is disposed of, abandoned or discarded.

The main purpose of RCRA was to address the problem of how to safely dispose of the large volumes of waste, including hazardous waste, generated by our society. RCRA was established to accomplish three goals:

1. To protect human health and the environment.
2. To reduce waste and conserve energy and natural resources.
3. To reduce the generation of hazardous waste as expeditiously as possible.

1.1.2 Comprehensive Environmental Responsibility, Compensation and Liability Act

The Comprehensive Environmental Responsibility, Compensation and Liability Act (CERCLA), commonly referred to as Superfund, was enacted in 1980. This was established to cleanup sites of hazardous waste contamination. The most important effect of this law is the establishment of a liability system which *makes the original generator of a waste responsible for that material forever*.

Of the various regulations that the generator must follow, the generator must also share in the responsibilities for the safe management and ultimate disposal of all wastes. If the transporter or disposal facility fails to take proper care of waste or does not prevent the wastes from being released into the environment, the generator can and will be held responsible.

1.1.3 Hazardous and Solid Waste Amendments

In 1984, Congress passed the Hazardous and Solid Waste Amendments (HSWA) which reauthorized RCRA. The main feature of this law is the land ban which mandated that all hazardous waste must be treated and made nonhazardous before disposal in landfill. NIU is classified as a “large quantity generator” under RCRA: the University generates more than 2,200 lbs. of hazardous waste or more than 2.2 lbs. of acute hazardous waste per calendar month. The hazardous waste generator status of a facility is an EPA designation that is based on the quantity of hazardous waste generated in any given month of the calendar year. Generator status is used to determine the facility’s level of regulation.

1.2 Regulations

The actual legal requirements associated with a particular law and the way it is enforced are determined by the regulations written for it. Regulations dealing with the disposal of waste in Illinois are a combination of local, state and federal requirements. All chemical waste, whether toxic, hazardous, or non-hazardous, is potentially regulated as *Illinois Special Waste* if placed in the trash and, therefore, should not be disposed of in this manner until a waste determination and non-special waste certification is made by EHS or ORCIS personnel. The regulations which govern Illinois Special Waste can be found in the IAC, Title 35, Subtitle G, Parts 808-809. It is a felony to knowingly and willfully dispose of material which meets these criteria in the normal trash or sewer.

In accordance with federal regulations, the State maintains a waste manifest system which tracks all hazardous waste generated in the state from the generator’s site until it reaches its final disposal site. The manifest is uniform across the country, so it is possible to track waste anywhere in the United States.

Other RCRA regulations require that large quantity generators of hazardous waste, such as NIU, maintain contingency plans for hazardous waste spills and inspect waste accumulation areas. Employees whose work generates hazardous waste must be trained in proper disposal procedures. In addition, generators must keep records of, and annually report to IEPA, the

amounts and types of waste generated. A special area of emphasis of these regulations is the development of a waste minimization program which is to reduce the amount of waste the generator produces.

All of the laws and regulations described above make compliance the responsibility of the generator. Ignorance of these laws or regulations is no defense against citations or fines. At NIU, the user of a hazardous chemical is ultimately responsible for compliance with regulations applicable to a particular chemical. The EHS Department and the ORCIS were established to assist the University community in compliance with these requirements.

1.3 Enforcement

The EPA is authorized to seek civil and criminal penalties for RCRA violations. Educational institutions have not been excluded. Several universities have been found guilty of RCRA violations and have had to pay substantial penalties. Under revisions applicable in October 1990, the individuals guilty of RCRA violations can be personally brought to court and face mandatory penalties as well as imprisonment. *One substantial penalty for violation of EPA regulations is that the institution and in consequence faculty, staff and researchers may not receive federal funds.* Due to these developments, universities must ensure that staff, faculty, and students understand waste management practices.

1.4 Reporting Inappropriate Disposal of Potentially Hazardous Chemicals

The inappropriate disposal of potentially hazardous chemicals is illegal and can have serious repercussions. Northern Illinois University is firmly committed to the safe and proper disposal of all its hazardous wastes. Moreover, the University is committed to promoting waste minimization and pollution prevention in all aspects of its activities.

Under no circumstances should hazardous wastes be discharged into the environment in an effort to “save money,” as a matter of “convenience,” or due to carelessness in planning, preparation, operations or design. Assistance in preventing or resolving such issues is always available from the Environmental Health and Safety Department or the Office of Research Compliance, Integrity and Safety.

If you suspect or have knowledge of the inappropriate disposal of potentially hazardous materials or deviations from the advice and guidance set forth in this guide, you should immediately report these concerns to EHS or ORCIS.

No employee of NIU shall be discriminated against or be subject to any reprisal for reporting suspected violations of the University’s policies on the disposal of potentially hazardous materials.

Part 2: Waste Minimization

The EPA's policy for hazardous waste management places the highest priority on waste minimization. The University must annually report to the government on efforts it has made to reduce hazardous wastes.

Waste minimization is any action that:

- Decreases the amount of hazardous waste generated;
- Reduces the inherent toxicity of the waste.

The costs associated with the proper disposal of chemical wastes and the safe storage of chemicals in the research laboratory are inextricably linked. Researchers are encouraged to limit the amount of chemicals purchased to what is needed. It is better to order additional chemicals than to dispose of unwanted or unused surplus chemicals. ***REMEMBER: The disposal cost can exceed ten times the cost of the chemical.***

In some cases, there are no acceptable waste disposal options. Review how you purchase, handle and store laboratory chemicals to control the increasing costs of proper chemical waste disposal and the inherent hazards of storing and working with hazardous chemicals.

Waste minimization benefits you, the University and the environment by:

- Significantly lowering costs;
- Reducing potential health hazards;
- Reducing potential long-term liabilities for disposal;
- Promoting environmental ethics; and
- Preventing pollution.

It is the responsibility of every individual who generates waste to incorporate the principles of waste minimization into experimental design. An important benefit from waste minimization is that it will help reduce the University's escalating chemical disposal costs.

2.1 Waste Minimization Techniques

2.1.1 Management

It is important to audit chemical supplies and use inventory control. Purchase only the quantity of chemical required and use all of what is purchased.

2.1.2 Process Modification

To the extent that it does not compromise vital research, teaching or service, research faculty and staff are encouraged to explore alternate experimental or standard processes to decrease the quantity of hazardous chemicals used and generated. Where possible, micro and semi-

micro techniques should be investigated as possible alternatives in order to reduce the amount of waste generated.

2.1.3 Product Substitution

Substitute non-hazardous or less toxic materials in your chemical processes and experiments. Some examples of this are:

- Using water-based inks instead of solvent-based inks in printing operations;
- Substituting detergents and enzymatic cleaners for sulfuric acid/potassium dichromate (chromerge) cleaning solutions and ethanol/potassium hydroxide cleaning solutions;
- Avoiding the use of known carcinogens, mutagens, or extremely hazardous chemicals where possible;
- SYBR Safe DNA gel stain, instead of ethidium bromide; and,
- Alcohol or glycol thermometers instead of mercury thermometers

2.1.4 Purchasing

Purchase only the quantity of chemical required for specific projects. Find the minimum unit required for an experiment and order accordingly. Do not stockpile chemicals unnecessarily. A significant percentage of waste disposed by the University consists of old, unused reagent chemicals.

2.1.5 Recycling/Redistribution

Chemicals that are like new or unopened can often be redistributed to other labs or work areas saving disposal costs for the University and new product costs for the recipient. Contact the Laboratory Safety Manager (ORCIS) if you have chemicals which can be recycled.

2.1.6 Segregation and Characterization

Do not mix hazardous wastes with nonhazardous waste. If any volume of listed hazardous waste is mixed with a nonhazardous waste, the resulting mixture is considered hazardous.

Do not mix different classes of hazardous waste together unless required as part of the experiment (i.e. putting mercuric chloride waste in with the acetone waste bottle). Refer to section IV of this Chemical Waste Management Guide entitled "Specific Handling Requirements for Chemicals".

It should be noted that dilution of a characteristically hazardous waste to make it nonhazardous is ***not an acceptable method of treatment.***

Accurately label waste bottles as to their exact content and approximate percentages. Segregation and characterization simplifies the waste streams, thus minimizing the cost of disposal.

Part 3: Hazardous Waste Definition

Hazardous materials are substances that have hazardous characteristics such as: flammable, corrosive, reactive, toxic, radioactive, poisonous, carcinogenic or infectious. In a general sense, wastes that contain these materials are considered hazardous because they present a potential risk to humans and/or the environment. Hazardous waste management plans generally separate waste into three broad groups: **radioactive, biohazardous and chemical.**

Radioactive waste is classified as either low-level or high-level waste. Low-level waste is typical of that found at medical and research institutions while high-level waste is typical of that generated at nuclear reactors. At Northern Illinois University, a radioactive waste is any waste with detectable radioactivity that is generated from procedures involving licensed radioactive material.

The definitions and disposal procedures for radioactive waste can be found in the NIU Radiation Safety Manual or by contacting the NIU Radiation Safety Officer.

Biohazardous waste is a term used to describe different types of waste that might include infectious agents. Currently, the following waste categories are considered to be biohazardous waste:

- Medical waste;
- Regulated waste;
- Laboratory waste and regulated waste; and,
- Pathological Waste (e.g., animal carcasses).

The definitions and disposal procedures for potentially infectious waste can be found on the NIU website under Research Compliance, Integrity and Safety.

Chemical waste includes a wide range of material such as discarded commercial chemical products (DCCP), process wastes and wastewater. Some chemicals and chemical mixtures are hazardous wastes because they are specifically listed by the EPA. A chemical waste that is not listed by the EPA is still a hazardous waste if it has one or more of EPA's four hazardous characteristics: **ignitability, corrosivity, reactivity or toxicity.**

Workers who generate hazardous waste(s) of any kind must be aware that there may be mixed hazards in their waste; that is, a combination of any of the three types of hazardous waste. For example, animal carcasses containing radioactive material, a hazardous chemical and perhaps an infectious agent would need to be managed according to the considerations and requirements of all three types of hazards defined above. If you will be generating mixed waste, contact the appropriate safety office to determine the proper way to handle and manage this material before the waste is generated.

3.1 Classification of Chemical Waste

Any chemical that exhibits hazardous characteristics as defined by federal and Illinois rules and regulations, is unusable or unwanted in any way and poses a potential hazard to individuals, the environment or public health is a hazardous chemical waste.

Examples:

- Waste and opened surplus chemicals
- Expired or off-specification chemicals
- Carcinogens and cytotoxic (antineoplastic) agents
- Prescription drugs and controlled substances
- Empty chemical drums and other chemical containers with a capacity of 10 gallons and greater
- Thermometers and other items containing mercury
- Non-returnable gas cylinders and lecture bottles or pressurized chemicals
- Residue of spill clean-up materials-contaminated rags and absorbents
- Non-radioactive lead shielding, lead blocks and lead scrap
- Photographic film processing solutions
- Used oil (motor, vacuum pump, lubricating)
- Pesticides
- Used solvents
- Paint, paint thinners, brush cleaners, linseed oil, thinner contaminated rags
- Heavy metal containing waste or products (arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver)

A chemical waste is considered to be a hazardous waste if it meets any of the four hazardous waste characteristics or if it is specifically listed by the EPA as a hazardous waste.

3.2 Characteristic Hazardous Waste

In addition to listed waste, any discarded material is considered to be a hazardous waste if it, or any component of the material, meets one or more of the four characteristics below.

3.2.1 Ignitable Waste (D001)

- A liquid that has a flash point of less than 140°F.
- A material that is not a liquid and is capable of causing fire through friction, absorption of moisture or spontaneous chemical change that can result in vigorous and persistent burning.
- An ignitable compressed gas.
- A material defined as an oxidizer by the Department of Transportation (DOT)

3.2.2 Corrosive Waste (D002)

- An aqueous solution which has a pH less than or equal to 2 or greater than or equal to 12.5.
- Is a liquid and corrodes steel at a rate greater than 6.35 mm per year at a test temperature of 55°C.

3.2.3 Reactive Waste (D003)

- A material that is normally unstable and readily undergoes violent chemical change without detonating.
- A material that when mixed with water reacts violently to form potentially explosive mixtures or can generate toxic gases, vapors or fumes in a quantity sufficient to present a danger to human health or the environment.
- Is a cyanide or sulfide bearing waste that can generate toxic gases, vapors or fumes.
- A material that is capable of detonation or explosive reaction if it is subjected to a strong initiating source or if heated under confinement.
- Is readily capable of detonation or explosive decomposition or reaction at standard temperature and pressure.

3.2.4 Toxic Waste (D004-D043)

Any waste which contains concentrations of certain constituents in excess of regulatory limits is a toxic hazardous waste. The 40 constituents that must be considered when evaluating a waste for potential toxic concentrations can be found in the regulations at [40 CFR 261.24](#).

3.3 Listed Hazardous Waste

There are four different groups of listed hazardous waste which in total includes over 800 different substances:

F-Listed	P-Listed	U-Listed	K-Listed
• Waste originating from non-specific sources.	• Waste that is <i>acutely</i> toxic.	• Waste that is toxic.	• Waste originating from specific sources.

3.3.1 The P-List and the U-List

P-Listed waste is particularly noteworthy in that it is defined as acutely toxic and, therefore, subject to more stringent accumulation requirements than other hazardous wastes. Containers that held an acute hazardous waste or a product that would become an acute hazardous waste when disposed of are not “empty” for hazardous waste purposes unless they have been triple-rinsed with a solvent that will dissolve the acute hazardous waste or product. The solvent must then be managed as an acute hazardous waste.

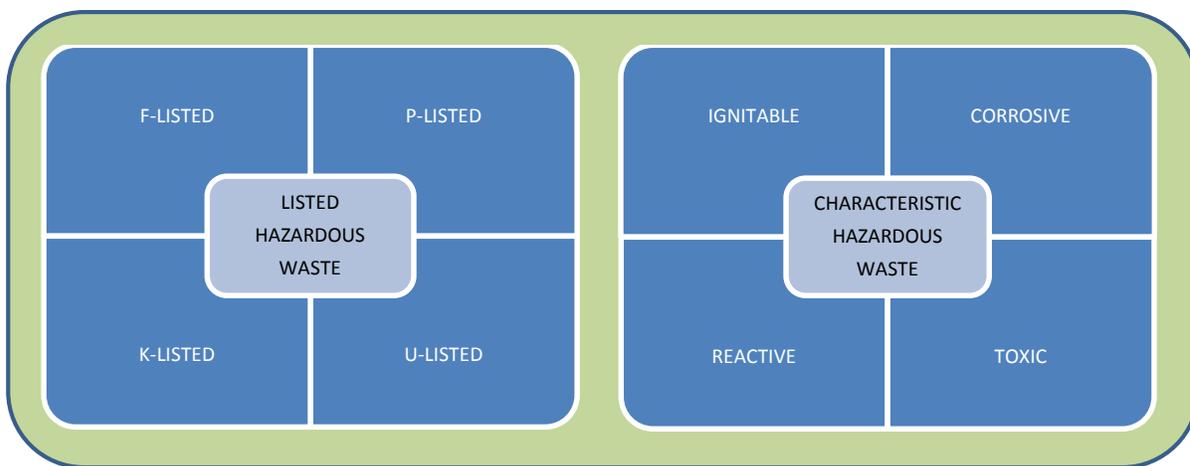
The P-list and the U-list include specific commercial chemical products in an unused form. In order to meet the criteria for a “P” or “U” listing, the waste material must not have been used for its intended purpose and consists of materials that have simply exceeded their expiration dates for usefulness. The individual chemicals and their corresponding Chemical Abstract Numbers (CAS) that comprise the “P” and “U” lists may be found in Title 40 of the Code of Federal Regulations Part 261.33 ([40 CFR 261.33](#)).

3.3.2 The F-List

This list identifies wastes from common manufacturing and industrial processes, such as solvents that have been used in cleaning or degreasing operations. Because the processes producing these wastes can occur in different sectors of industry, the F-listed wastes are known as wastes from non-specific sources. Wastes included on the F-list can be found in the regulations at [40 CFR 261.31](#).

3.3.3 The K-List

This list includes certain wastes from specific industries, such as petroleum refining or pesticide manufacturing. Certain sludges and wastewaters from treatment and production processes in these industries are examples of source-specific wastes. The University does not generate any K-listed waste. Wastes included on the K-list can be found in the regulations at [40 CFR 261.32](#).



If your waste falls into either the *listed* or *characteristic* categories it must be treated as a hazardous waste. Hazardous waste **cannot** be disposed of by pouring down a drain, evaporation, or by throwing in the general trash. There are significant fines and penalties involved when hazardous waste is disposed of illegally. In addition to the legal ramifications please realize that toxic wastes disposed down the sink or in the trash may cause environmental harm and can also create an unacceptable risk to human health.

However, there may occasionally be a waste generated that does not meet the listing or characteristic criteria for a hazardous waste and that the generator, based on their knowledge, believes to be safe for drain or trash disposal. These situations can be evaluated on a case by case basis by the ORCIS and a written determination will be provided to the generator. ***Under no circumstances may any waste material be drain disposed without having received prior approval.***

Part 4: Specific Handling Requirements for Chemicals

4.1 Acids, Bases, and Aqueous Solutions

Do NOT mix strong inorganic acids (e.g., HCl and HNO₃) or oxidizers with organic compounds. Keep acids, bases or aqueous solutions containing heavy metals separate from other waste. Avoid mixing concentrated acids and bases together in the same container.

4.2 Aerosol Cans

Many products come in aerosol cans, including cleaners, coolants, paints, lubricants and starting fluid. Aerosol cans frequently contain hazardous materials that are flammable or toxic. Aerosol cans should be disposed through EHS by requesting a chemical waste pickup.

4.3 Arsenic

Any compound containing Arsenic > 5.0 mg/L is regulated as a Hazardous Waste under RCRA. The use of any arsenic compound must be limited to that which is essential to research. Do not keep any arsenic compounds in your inventory for which you do not have an immediate use.

4.4 Asbestos

The definitions and disposal procedures for asbestos waste can be found in the NIU Asbestos Management Program and Procedures Manual or by contacting EHS.

4.5 Bulk Chemicals (20, 30 or 55 Gallon Drums)

Drums should be in good condition, have workable bungs and approved by the Department of Transportation (DOT). Original shipping containers are DOT approved for disposal of the used or discarded original material. **Do NOT store metal drums outside where they will rust. Do NOT pack smaller containers of chemical into a large drum for disposal.**

4.6 Compressed Gas Cylinders

Cylinders are pressure vessels intended to hold compressed gases. The sudden release of compressed gas could cause the cylinder to expel shrapnel or become a projectile, resulting in extensive property damage, serious injury or even death. Any cylinder still containing material should be considered hazardous and disposed of in accordance with federal, state and local regulations.

All departments are required to return discarded gas cylinders to the vendor to regain the deposit on the cylinder and minimize rental charges. For non-refillable cylinders or cylinders that cannot be returned to the manufacturer, contact the EHS department for proper disposal.

4.7 Controlled Substances

Substances controlled by the Drug Enforcement Agency (DEA) cannot be disposed by our usual chemical waste disposal firm. Controlled substances must be transferred using the DEA form 222. Contact the ORCIS for disposal procedures.

4.8 Ethidium Bromide

Ethidium bromide and its byproducts are strong mutagens, possible carcinogens and possible teratogens at higher concentrations. Aqueous solutions containing less than 5 mg/L may be discarded by flushing down a sanitary sewer. ***Do NOT intentionally dilute any solution to avoid proper disposal methods.*** Aqueous solutions containing more than 5 mg/L EtBr should be collected for disposal by ORCIS.

4.9 Formalin and Formaldehyde Solutions

Formalin is the commercial name given to a formaldehyde solution. Formaldehyde solutions should be stored for disposal by EHS. Formaldehyde is a suspected carcinogen with a low permissible exposure limit (PEL) and poor warning properties.

4.10 Mercury and Mercury Compounds

Hazardous waste regulations require that wastes containing mercury be sent to a facility where mercury can be recovered in a retort or roasting thermal process unit. The use of mercury is strongly discouraged.

Mercury is defined as a hazardous material by the EPA. Therefore, all mercury “spills” need to be cleaned up following safe and environmentally sound procedures by specially trained personnel. Mercury and all materials contaminated with mercury must be turned over to EHS. No mercury, including broken thermometers, may be disposed of in the normal trash or the sewer system.

4.11 Oils, Lubricating Fluids and Cooling Fluids

This category of material is collected for recycling and includes: motor oil, transmission fluid, lubricating oil, cutting oil, hydraulic oil, and vacuum pump oil. Collect waste oils in 1-gallon, 5-gallon or 55-gallon containers depending on the volume of material generated. This waste stream is nonhazardous if it is recycled and therefore exempt from the 90 day storage limit. ***Do NOT mix flammable solvents, halogenated solvents (degreasers), water or antifreeze with waste oils.***

4.12 Organic Solvents and Ignitable Liquids

Keep halogenated wastes separate from non-halogenated solvent wastes if possible. Separate organic solvents from aqueous solutions whenever possible. Keep acidified solvents separate from other solvent and acid wastes.

4.13 Paint and Paint Thinner

Separate solid paint sludge from paint thinners by pouring off thinners into a separate waste container. *Do NOT put brushes, rollers, paper or other debris in paint wastes.* Keep water and water-based paint wastes separate from oil-based paint wastes. Rinsate from water-based paint cleanup is nonhazardous and can be disposed of down the sanitary sewer.

4.14 Photodeveloper and Photofixer

Photodeveloper is a hazardous waste if it contains constituents in concentrations greater than those listed in 40 CFR 261.24, if it is corrosive (pH < 2 or > 12.5) or if it is ignitable. Used photofixer contains silver, a heavy metal, and therefore is hazardous. It may also be corrosive. Collect fixer and developer in separate 5-gallon polyethylene containers.

4.15 Unknowns

Chemical wastes with no identification (unknowns) present a particularly dangerous threat, due to their unknown composition and characteristics. Unknown waste should not be transported, treated or disposed of until chemical analysis has been completed to determine the hazardous properties.

All users of chemicals are required to properly label each and every container of chemicals, including chemical wastes, indicating by proper chemical name(s) the nature of its contents. Any container not so labeled will be considered to contain unknown chemicals for disposal and will require that the generator have the unknown(s) characterized at the generator's expense.

If an unlabeled container is found, it is to the advantage of the generator to make use of any knowledge which may exist as to the circumstances in which the unknown was generated. Such information can often aid in simplifying the characterization process and therefore reducing the cost to the generator.

If you have an unknown material, contact the Environmental Protection Specialist or the Laboratory Safety Officer. The unknown material will then be analyzed to either determine the chemicals involved or characterize the unknown into a category for legal disposal.

Part 5: Management of Hazardous Waste

Northern Illinois University is classified as a Large Quantity Generator by the EPA and permitted by the state and federal government to store hazardous waste generated by the University. Hazardous waste is disposed of by contract and is hauled off site approximately four times a year. Wastes may be reclaimed, recycled, chemically or physically treated or destroyed by high temperature incineration.

5.1 Waste Accumulation and Storage Areas (40 CFR 262.34)

There are only two types of hazardous waste accumulation and storage areas managed at the University. These areas and a brief description of each are listed below. All waste accumulation and storage areas are subject to routine audits and inspections by regulatory authorities who may conduct audits *unannounced at any time* they see fit.

5.1.1 Satellite Accumulation Areas (SAA)

The regulations define any location where small amounts of chemical waste are temporarily stored prior to pick up as a “Satellite Accumulation Area” or “SAA”. These areas are individual research, clinical and teaching laboratories/classrooms, hospital patient care areas, or other rooms in which hazardous waste generation occurs. The hazardous waste containers in an SAA must always remain at or near the point of generation (i.e., at or near the benchtop or within the room itself) and must be under the control of the operator of the process generating the waste at all times until they are ready for pick up by EHS personnel.

At no time may more than 55 gallons of hazardous waste or 1 quart of acute hazardous waste (e.g., “P-Listed”) accumulate in an SAA prior to pick up or movement of the waste container to a proper storage area. Any waste in excess of the 55-gallons or 1 quart limits must be removed from the SAA within 3 calendar days. Therefore, once the threshold is reached, contact EHS or ORCIS immediately.

5.1.2 90 Day Storage Area

The only storage area on the University’s main campus that falls into this classification is located in the Hazardous Materials Storage Building. There is no regulatory limit on the overall amount of waste that can be stored in the building as long as no waste remains within the area for greater than 90 days. Weekly inspections, specific storage requirements, emergency procedure availability, training and recordkeeping requirements exist for this area.

5.2 Labeling and Dating of Waste Containers [40 CFR 262.34(c)(1)(ii)]

Each and every hazardous waste container must be labeled with the words “Hazardous Waste” when the first drop of waste is poured into the container. Additionally, during its use the generator must keep a running label of the contents of the container. Small bottles of discarded chemical commercial products in their *original container* do not need to be labeled

with the words “Hazardous Waste”. When labeling waste be specific (e.g., “Xylene”, “Acetone”, “Toluene”, etc.) instead of using generalities such as “Non-Halogenated Solvents”. Do not use abbreviations, chemical formulas or trade names. Descriptions such as “Waste” or “Acetone Waste” in and of themselves are not acceptable, but may be included as supplemental information. Proper labeling will eliminate the problem of identifying unknown chemicals and wastes. No date should be placed on the label during the period the container is being used.

Hazardous waste containers within the 90 day accumulation area must be labeled with “Hazardous Waste” and also must have the date clearly shown on the container when it was moved into the Hazardous Materials Storage Building. The chemical names of substances in the container must be listed on the container or readily available.

5.3 Hazardous Waste Containers (40 CFR 265.172)

The best containers for hazardous waste are the original ones the materials came in. If the original container cannot be used, then a comparable container with an equal or greater United Nations (UN) rating is acceptable. Containers such as 5-gallon plastic jugs and 4-liter glass bottles are acceptable if the container and any residue left inside are compatible with the new waste material (i.e., no acids in steel containers). Larger containers are better if they can be filled within a reasonable time and do not present a storage hazard at your location. For liquids, fill containers to about 90 percent of container volume to allow for liquid expansion. Do **NOT** fill containers to the top. Please fill the containers to within 1 or 2 inches from the cap before requesting disposal. This will aid the University in reducing waste, cutting costs and also speed up removal of wastes from your location.

5.4 Proper Lids For Containers [40 CFR 265.173(a)]

All containers must have a secure, tight fitting, non-leaking lid. When the container is full the lid must be exchanged with a proper lid. Cracked or leaking lids sealed with parafilm are a deviation from storage requirements and must be changed immediately when found and prior to pick up by EHS. Corks placed into containers are also not considered secure and must not be used. Lids must be secure on containers at all times unless waste is physically being added to the container.

5.5 Storage, Compatibility and Safety

All waste must be stored in a safe and secure area. Never leave waste in a hallway, loading dock or other unsecured area where it may be subject to public contact. The best places to accumulate wastes are under fume hoods or inside an appropriate safety cabinet. Waste stored in *Satellite Accumulation Areas* must be near the point of generation and always under the control of trained personnel.

Hazardous waste should never be stored in or around drains or sinks. If it is unavoidable for the waste container to be near a drain, then a spill tray should be used. Chemicals and waste products should enter the sewer only through actions incidental to the process of experiment,

such as container washing and rinsing. Never allow flammable liquids, heavy metals or extremely toxic substances to enter the sewer.

Incompatible wastes or chemicals must be separated by storing wastes in separate containment bins. Accidental mixing of one hazardous waste with another may result in a vigorous and dangerous chemical reaction. Generation of toxic gases, heat, possible overflow or rupturing of receptacles, fire and even explosions are possible consequences of such reactions. Check with appropriate staff, Safety Data Sheets (SDS) or other applicable literature to determine chemical compatibility.

5.6 Inspections

Each laboratory generating hazardous waste on campus must establish a *Satellite Accumulation Area*. This is the point of generation for hazardous waste. Personnel working in a SAA should check the containers daily to insure they are properly closed, incompatible segregation is occurring, drains are properly protected, the containers are under control of the lab personnel, full containers are in the process of being removed, and the thresholds of 55 gallons of hazardous waste or 1 quart of acute hazardous waste are not being reached. If a waste container is full, it can no longer be accumulating, since it cannot have any more material put in it. If this waste is left in the laboratory for three days, the satellite area is then deemed by the EPA as having become a Central Accumulation Facility. This area could then be cited for failure to follow requirements for a Central Accumulation Facility, including weekly inspections, physical separation of waste and other requirements.

The Hazardous Materials Storage Building is designated as the University's *90 Day Storage Area* and subject to weekly inspections. The inspections should follow the inspection checklist for the area and must include the date of inspection, the person performing the inspection and any deficiencies noted along with documentation of corrective actions taken.

5.7 Scheduling a Chemical Waste Pickup

Hazardous and chemical waste containers may only be moved from the SAA to designated storage areas by trained personnel. Prior to having the waste picked up, information must be provided to EHS or ORCIS to adequately characterize and dispose of the waste. The waste generator should be ready to provide this information when a request for pickup is made. Requests for pickups should be sent to either: 1) EHS by calling 815-753-0404 or via email at dmannia@niu.edu; 2) ORCIS by calling 815-753-1610 or via email at jgable@niu.edu. Allow 3-5 business days for pickup.

EHS and ORCIS will evaluate the information and schedule the material for pickup. If the information provided is insufficient, additional information will be requested from the generator. Waste will not be picked up until the appropriate information is received. Wastes may require the generator to certify the presence or absence of constituents and concentrations. This certification can be based on the generators knowledge, analytical testing or other scientific data.

The generator, in making the certification, accepts the associated liability and responsibility for possible misrepresentation of the waste. ***Penalties for misrepresentation, a violation of state and federal law, can include fines and/or imprisonment.***

Part 6: Universal Waste Management and Recycling

A subset of very common hazardous waste is managed as universal waste and subject to less stringent guidelines set up to encourage recycling and reduce illegal disposal. The EPA's universal waste regulations (40 CFR 273) streamline hazardous waste management standards for federally designated "universal wastes," which include batteries, spent fluorescent lamps (lights), pesticides and certain mercury containing equipment. All universal wastes are hazardous wastes and would otherwise have to be managed under the same stringent standards as other hazardous wastes.

NIU is currently a Small Quantity Generator (SQR) of Universal Waste, meaning that NIU does not accumulate 5,000 kg or more of universal waste at any time. Universal wastes must be labeled as such with a "Universal Waste" label, the container dated when material is placed into it and may not be accumulated for more than one year. EHS is charged with assisting universal waste generators to ensure proper management of universal waste, including handling, storage and disposal in accordance with state and federal regulations.

6.1 Batteries

A "battery" is defined as a device consisting of one or more electrically connected electrochemical cells that is designed to receive, store and deliver electric energy. Many spent batteries such as lithium ion (Li-Ion), nickel cadmium (Ni-Cd), nickel metal hydride (Ni-MH) and lead acid batteries are classified as universal waste.

Alkaline batteries (AAA, AA, C, D, 9V, etc.) are not hazardous and do not qualify as universal waste. However, although there is no EPA requirement to recycle alkaline batteries, the University has chosen to adopt a recycling program to keep these batteries out of the landfill.

An initiative sponsored by the NIU Green Team, Campus Mail Services and the EHS Department allows campus departments to ship spent alkaline batteries (along with miscellaneous rechargeable batteries) to the campus mail room. Upon receipt, EHS staff segregates the batteries by chemistry type, verifies that the terminals are properly sealed and packages the batteries in drums for shipment per DOT regulations. The EHS Department maintains recycling documentation on file.

6.2 Lamps

A "lamp" or "universal waste lamp" is defined as the bulb or tube portion of an electric lighting device. A lamp is specifically designed to produce radiant energy, most often in the ultraviolet, visible or infra-red regions of the electromagnetic spectrum. Common examples of universal waste electric lamps include, but are not limited to, fluorescent, high intensity discharge, neon, mercury vapor, high pressure sodium and metal halide lamps. These lamps are known to contain trace amounts of mercury vapor and other heavy metals. Used lamps are collected by Building Services, the Electrical Shop and the EHS Department. The lamps

are segregated by type, placed into suitable containers, labeled and packaged on pallets per DOT regulations. The EHS Department maintains recycling documentation on file.

6.3 Mercury Containing Equipment

This category includes devices, items or articles (excluding batteries and lamps) that contain varying amounts of elemental mercury integral to its function. Some commonly recognized devices are thermostats, barometers, temperature and pressure gauges, manometers and mercury switches.

6.4 Used Oil

This group of waste includes any oil that has been used and no longer satisfactory for its intended use (e.g., used motor oil, transformer oil, vacuum pump oil, etc.). Used oil is recycled from various operations and applications across campus. The EHS Department maintains recycling documentation on file.

6.5 Smoke Detectors

Smoke detectors and alarms are important safety devices. During the inspection, testing and maintenance of the University fire alarm systems, these devices are periodically removed from service and must be properly disposed. Smoke detectors typically fall within two categories: photoelectric and ionization.

6.5.1 Photoelectric

Photoelectric technology smoke detectors consist of a light-emitting diode (LED) and a photocell. Photoelectric smoke detectors are transferred to Materials Management and incorporated into the University's electronic waste recycling program.

6.5.2 Ionizing

Ionization sensor smoke alarms contain a small amount of radioactive material (Americium-241) embedded in a gold foil matrix within an ionization chamber. Ionizing smoke detectors are shipped to an outside contractor using approved shipping containers and packaging methods. The EHS Department maintains recycling documentation on file.

6.6 Used Tires

The Transportation Department assumes the responsibility for properly disposing of used tires generated by the University. The Transportation Department uses a registered used tire transporter and keeps all records of used tire shipments on file for a period of three years.

