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**Beverly K. Fine School of the Sciences
Hazardous Waste Management Plan**

**Kevin J. Manning Academic Center
Owings Mills North Campus
11200 Ted Herget Way
Owings Mills, Maryland 21117**

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11200 Ted Herget Way, Owings Mills, Maryland 21117

HAZARDOUS WASTE MANAGEMENT PLAN

1.0 POLICY STATEMENT

The Beverly K. Fine School of the Sciences (SOS) faculty, staff, and students who generate, handle, store, transport, or dispose of hazardous wastes are responsible for following the guidelines and procedures set forth in the SOS Hazardous Waste Management Plan.

2.0 PURPOSE

The Hazardous Waste Management Plan will address the requirements of the State of Maryland regulations otherwise known as Code of Maryland (COMAR) which complies and in some instances supersedes the Environmental Protection Agency's (EPA) Resource Conservation and Recovery Act (RCRA). This Plan applies to all SOS laboratory science operations.

3.0 SCOPE

This Plan incorporates SOS faculty, staff, and students who have the potential to handle hazardous chemicals resulting in waste generation.

4.0 DEFINITIONS

- 4.1 **Central Accumulation Area** (Main Accumulation Area) – Area designated for the storage of hazardous wastes prior to shipment to permitted disposal facilities.
- 4.2 **Code of Federal Regulations** (CFR) – The regulations published in the Federal Register by the executive departments and agencies of the federal government. Broken down by title, part, section, and paragraph.
- 4.3 **Disposal** – The discharge, deposit, injection, dumping, spilling, leaking, or placing of any solid waste or hazardous waste into or on any land or water so that such solid waste or hazardous waste or any constituent thereof may enter the environment or be emitted into the air or discharged into any water, including ground waters.
- 4.4 **EPA Identification Number** – The number assigned by the Environmental Protection Agency to each generator, transporter, processing, storage, and disposal facility.

- 4.5 **Facility** – Includes (1) all contiguous land, and structures, other appurtenances, and improvements on the land, used for treating, storing, or disposing of hazardous waste, or for managing hazardous secondary materials prior to reclamation. A facility may consist of several treatment, storage, or disposal operational units (e.g. one or more landfills, surface impoundment, or combinations of them). (2) For the purpose of implementing corrective action under 40 CFR 264.01 or 267.101, all contiguous property under the control of the owner or operator seeking a permit under Subtitle C of RCRA. This definition also applies to facilities implementing corrective action under RCRA Section 3008(h). (3) Notwithstanding paragraph (2) of this definition, a remediation waste management site is not a facility that is subject to 40 CFR 261.101, but is subject to correction action requirement if the site is located within such a facility.
- 4.6 **Generator** – Any person, by site, whose act or process produces hazardous waste or whose act first causes a hazardous waste to become subject to regulation.
- 4.7 **Hazardous Material** – A substance or material, including a hazardous substance, which has been determined by the Secretary of Transportation to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce.
- 4.8 **Hazardous Waste** – Any solid waste material listed or identified in 40 CFR 261, Subpart C and D, or exhibiting the characteristics of ignitability, corrosivity, reactivity, or toxicity also defined in Part 261. A hazardous waste as defined in COMAR 26.13.02 as synonymous with Controlled Hazardous Substance (CHS), except as provided in COMAR 26.13.02.06.
- 4.9 **Manifest** – The shipping document, EPA Form 8700-22 (including, if necessary, EPA Form 8700-22A), originated and signed by the generator or offeror in accordance with the instructions in the Appendix to 40 CFR 262 and the applicable requirements of COMAR 26.13.03.04 and 40 CFR Parts 262 through 265.
- 4.10 **Offeror** – A person that performs, or is responsible for performing, any pre-transportation function required under the U.S. Department of Transportation's (DOT) hazardous material regulations of 49 CFR Parts 171 through 180 for transportation of a hazardous material in commerce; or tenders or makes a hazardous material available to a carrier for transportation in commerce.
- 4.11 **On-site** – The same or geographically contiguous property which may be divided by public or private right-of-way, provided the entrance and exit between the properties is at a cross-roads intersection, and access is by crossing, as opposed to going along, the right-of-way. Noncontiguous properties, owned by the same person but connected by a right-of-way which the property owner controls and to which the public does not have access, are also considered on-site property.

- 4.12 **Operator** – The person responsible for the overall operation of a facility.
- 4.13 **Owner** – The person who owns a facility or part of a facility.
- 4.14 **Processing** – The extraction of materials, transfer, volume reduction, conversion to energy, or other separation and preparation of solid waste for reuse or disposal.
- 4.15 **Reclaimed Material** – Material that is processed or regenerated to recover a usable product. Examples include the recovery of lead from spent batteries and regeneration of spent solvents.
- 4.16 **Recyclable Materials** – Material that is used, reused, or reclaimed.
- 4.17 **Satellite Accumulation Area** – An area, system, or structure used for temporary accumulation of hazardous waste prior to transport to the Central Accumulation Area. Accumulation must not exceed 55 gallons of hazardous waste or 1 quart of acutely hazardous waste.
- 4.18 **Solid Waste** – Any garbage, refuse, sludge or other discarded material, including solid, liquid, semi-solid, or contained gaseous material resulting from institutional activities.
- 4.19 **Spill** – The accidental spilling, leaking, pumping, pouring, emitting, or dumping of hazardous wastes or materials which, when spilled, become hazardous wastes into or onto any land or water.
- 4.20 **Storage** – The holding of solid waste for a temporary period, at the end of which the hazardous waste is treated, disposed of, or stored elsewhere.
- 4.21 **Transporter** – A person engaged in the offsite transportation of hazardous waste by air, rail, highway, or water.
- 4.22 **Universal Waste** – Any of the following hazardous wastes that are managed under the universal waste requirements of COMAR 26.13.10.06—.25: (a) Batteries as described in COMAR 26.13.10.07; (b) Pesticides as described in COMAR 26.13.10.08; or (c) Mercury-containing equipment, lamps, or PCB-containing lamp ballasts, each as described in COMAR 26.13.10.09.
- 4.23 **Used Oil** – Oil that has been refined from crude oil, or any synthetic oil that has been used and, as a result of the use, is contaminated by physical or chemical impurities.
- 4.24 **Waste** – Any material for which there is no use and is to be discarded as valueless.

5.0 INTRODUCTION

The intention of this Plan is to provide SOS faculty, staff, and students with an understanding of Federal and State hazardous waste disposal regulations and explain the SOS's program for compliance. Stevenson University (SU) is a large quantity generator of hazardous waste and must comply with all State and Federal waste disposal regulations.

The Laboratory Safety Manager administers the Hazardous Waste Management Plan within the Beverly K. Fine School of the Sciences. Complying with the program is very demanding and requires full cooperation by all SOS faculty, staff, and students. This Plan focuses on the management of hazardous chemical waste. It does not include procedures for the management of infectious and biological waste or nonhazardous waste. Once a listed or characteristic chemical is declared waste, it must be stored as such. SU has a Central Accumulation Area and various satellite accumulation areas within the laboratories. SU is not permitted to treat or dispose of hazardous waste locally. All hazardous waste must be transported to a permitted off-site facility for further storage, treatment, and/or disposal. It is illegal to dispose of hazardous waste by dilution, evaporation, dumping into the sewer, or dumping into the local landfill. Additional information on specific responsibilities and procedures may be obtained by contacting the Laboratory Safety Manager who manages hazardous waste disposal and maintains records of all disposed waste.

6.0 HAZARDOUS WASTE DISPOSAL REGULATIONS

The Solid Waste Disposal Act as amended by RCRA was passed in 1976 and is administered by the EPA under Subtitle C, Hazardous Waste Management. The EPA has the responsibility of regulating hazardous chemical wastes. RCRA has established a cradle to grave Hazardous Waste Management Program. This program protects public health and the environment from improper disposal by ensuring that all hazardous waste is regulated and accounted for through a manifest system from the generation of the waste (cradle) to the proper disposal of the waste (grave), and all aspects in between. This law went into effect in November 1980 and has undergone revisions on a regular basis.

Hazardous waste generators may not store, process, dispose of, or transport hazardous waste without having received an EPA Identification Number. Nor can generators offer hazardous waste to transporters or to storage, processing, or disposal facilities without assigned EPA Identification Numbers. Before transporting or offering hazardous waste for transportation to an off-site facility, all requirements for packaging, labeling, marking, and placarding must be met in accordance with all Department of Transportation (DOT) regulations. A hazardous waste manifest must accompany every shipment. Only an EPA permitted Municipal Hazardous Waste (or Class I Industrial Hazardous Waste) Disposal Facility can dispose of hazardous waste and are approved to perform incineration, neutralization, recycling, or landfill operations.

Non-compliance with any hazardous waste regulation may result in substantial fines and penalties against the University. Individual generators causing a violation may also be found personally liable. The University and/or the generators may be cited or fined for numerous types of violations. Violations range from failure to properly label a container of hazardous waste, to intentionally disposing of hazardous waste into the air, down the drain, or in the trash.

7.0 ROLES AND RESPONSIBILITIES

7.1 Stevenson University Responsibilities

- Follow all Federal, State, and local regulations regarding hazardous waste.
- Fund the collection, storage, and disposal costs for campus entities.

7.2 Laboratory Safety Manager Responsibilities

- Follow all Federal, State, and local regulations regarding hazardous waste.
- Maintain Federal, State, and local hazardous waste reference materials, definitions, and lists of such wastes.
- Provide reports to Federal and State agencies as required.
- Maintain disposal service records (manifests). The Laboratory Safety Manager shall maintain a copy of the service contractor's shipping manifest for a minimum of three years.
- Inspect the Central Accumulation Area weekly and document.
- Inspect the Satellite Accumulation Areas weekly and document.
- Review and prescribe methods of collection and labels, as needed.
- Coordinate disposal requirements with the requestor and supply chemical waste disposal labels.
- Provide Laboratory Safety Training to employees who use chemicals in the course of their job functions and independent research students who use chemicals as a part of research. Ensure faculty, staff, and students receive training annually.
- Arrange for disposal of waste with the designated service contractor.

- Ensure contractors who conduct on-site visits are trained and certified to conduct the inspection, collection, packaging, labeling, and transporting of hazardous wastes from the University.
- Approve any alternative to waste disposal by the service contractor.

7.3 Laboratory Services Team

- Follow all Federal, State, and local regulations regarding hazardous waste.
- Attend initial and annual refresher training.
 - Any employees who use chemicals in the course of their job functions must be provided annual Laboratory Safety Training by the Laboratory Safety Manager.
 - Any employees who work with hazardous waste (i.e., transporting waste from labs to storage areas) must receive Hazardous Waste Operations and Emergency Response (HAZWOPER) training required by Occupational Safety and Health Administration (OSHA) under 29 CFR 1910.120.
- Wear chemical splash goggles, lab coats, gloves, and any other specified personal protective equipment, provided by SU, when handling hazardous wastes.
- Identify materials and conduct waste characterization of all wastes as they are generated.
- Inspect waste containers prior to use to ensure there are no cracks, warping, or defects in the container material.
- Keep waste streams and incompatibles segregated. This includes all chemicals, scraps contaminated with chemicals, and empty chemical containers.
- Ensure waste is properly identified and labeled.
- Accumulate spent chemical products in designated waste containers and manage containers.
- Transport the hazardous waste to the Central Accumulation Area where the hazardous waste shall be segregated and stored until a qualified waste disposal service contractor is scheduled to dispose of the hazardous waste.
- Maintain accumulation and storage areas.

7.4 SOS Faculty, Staff, and Student Responsibilities

- Follow all Federal, State, and local regulations regarding hazardous waste.
- Minimize waste generation where possible. (Check the chemical inventory prior to ordering any chemical stocks to confirm that the SOS does not already have the chemical in stock.)
- Correctly identify hazardous materials (e.g. laboratory waste materials) by using a chemical waste disposal label for each container of waste material. The steps of completing and attaching disposal labels are listed below:
 - Ensure the containers for liquid and/or solid hazardous waste are in good condition so that they may be handled safely. Containers must be suitable for storing chemical waste for at least 180 days.
 - List the chemical(s) on the waste disposal label using the common name of the chemical(s). Chemical formulas and abbreviations are not acceptable under Federal and State regulations.
 - The concentration and amount of waste must be included on the waste disposal label.
 - The waste disposal label must include the date that accumulation started as well as the date that the container was moved to the Central Accumulation Area.
 - Place labeled containers of liquid and/or solid hazardous waste in the designated Satellite Accumulation Area labeled “Hazardous Waste Satellite Accumulation Area”. Do not store waste containers in corridors (e.g. hallways, passageways, etc.).
 - Improperly identified waste material will not be collected until the contents of the hazardous waste container is determined.
 - Unknown hazardous waste may be picked up if arrangements have been made with the Laboratory Safety Manager. Departments may be charged the cost of analyzing the unidentified waste to determine its chemical identity.
 - Faculty and staff who use chemicals in the course of their job functions and independent research students who use chemicals in their research are required to participate in annual Laboratory Safety Training provided by the Laboratory Safety Manager.

7.5 Service Contractor Responsibilities

- Follow all Federal, State, and local regulations regarding hazardous waste.
- The service contractor who conduct on-site visits must be trained and certified to conduct this type of work.

- Conduct on-site visits multiple times a year to collect hazardous wastes from designated storage areas.
- Package the waste, label the shipping containers, and complete the shipping manifests in accordance with Federal and/or State requirements before removal from campus.
- Ensure the truck driver that will be transporting the hazardous waste meets all DOT qualifications and requirements.
- Ensure the truck that will be transporting the hazardous waste is inspected to meet all Federal and State regulations.
- Ensure the truck is loaded and placarded in accordance with all Federal and State regulations.
- Transport the hazardous wastes to authorized disposal facilities.

8.0 HAZARDOUS WASTE DISPOSAL PROGRAM

8.1 Hazardous Waste Disposal Guidelines

- The Laboratory Safety Manager will administer the program, oversee collection services, and provide technical support to the various generators within the SOS. Individual departments are responsible for proper identification of the hazardous waste they generate and following University's procedures in disposal of that waste.
- In laboratory situations, a material is considered waste when the lab personnel determine the chemical will no longer be used and needs to be discarded. The waste regulations apply to any material, whether it is liquid, solid, semi-solid, or compressed gas. Wastes can be hazardous in one of four ways: (1) wastes and spent materials that are hazardous by definition and contained in specific lists, (2) chemicals that exhibit one or more of the four hazardous characteristics: ignitability, reactivity, corrosivity, or toxicity, (3) a mixture containing a listed hazardous waste and a non-hazardous waste, (4) a chemical that is not excluded from regulation as a hazardous waste. The hazard characteristics are defined in 40 CFR Sections 261.21-261.24. Hazardous waste is categorized into several groups including: flammable halogenated solvents, flammable non-halogenated solvents, acids, bases, heavy metals and oxidizers, flammable solids, non-flammable solids, and miscellaneous salts.
- The following approach is designed to ensure compliance with applicable Federal and State requirements for the proper handling of hazardous waste. It is also intended to reduce any potential impact on human health and the environment.

- The hazardous waste accumulation areas are maintained under the control of the Laboratory Safety Manager, with the assistance of the rest of the Laboratory Services team members. These individuals are responsible for the care, custody, and control of the area. Keys and access to the hazardous waste storage areas are closely controlled.
- All spent chemicals or unused chemicals that are intended to be discarded must be handled and managed as hazardous waste, unless determined otherwise by the Laboratory Safety Manager.
- Each individual waste generator is personally responsible for ensuring that hazardous wastes are properly segregated, accumulated in safe, transportable containers, and stored properly to prevent the possible exposure of others working in that area or hazardous waste management personnel to the waste materials. Refer to RCRA's Chemical Waste Compatibility List found in Appendix A for guidance on the segregation of incompatible waste materials.
- Individual waste generators are responsible for obtaining their own waste containers. All containers must have suitable screw caps or other secure means of closure. When special waste containers are warranted, contact the Laboratory Safety Manager for assistance on selection and placement of appropriate container type and size.
- The original chemical label must be destroyed or defaced on empty chemical bottles used for waste accumulation. Be sure the container is in good condition, will not leak, and is compatible with the contents (i.e. do not use metal containers for corrosive waste or plastic containers for organic solvents).
- The container must be dated and its contents fully identified on the label when the chemical waste is placed in the hazardous waste Central Accumulation Area (N162).
- Improper disposal of hazardous chemicals includes drain disposal, intentional evaporation (including in a fume hood), and disposal in the regular trash.
- Treatment of waste by the generator is prohibited under RCRA regulations without the proper RCRA treatment permit. However, reducing the hazard or quantity of generated waste can be done in the laboratory, without a RCRA treatment permit, when the treatment method is included as part of the experimental protocol.
- Outside of experimental procedure, do not mix non-hazardous waste, such as water, with hazardous waste.

- Containers with improper caps, leaks, outside contamination, or improper labeling must be corrected immediately by the generator prior to removal from the laboratories to the Central Accumulation Area.
- Hazardous waste should be stored apart from non-hazardous waste.
- Different hazardous waste streams must not be co-mingled in the same waste container.
- Chemically contaminated sharps (i.e. needles, razor blades, syringes, etc.) must be disposed of in the white leak proof plastic containers for disposal and labeled properly.
- Do not dispose of inorganic heavy metal compounds into hazardous waste containers with waste solvents.
- Dry materials saturated with chemicals (paper, rags, towels, gloves, Kim wipes, etc.) must be double-bagged in heavy-duty plastic bags and labeled with contents.
- Whenever possible, return gas cylinders to the manufacturer or distributor. If they cannot be returned, tag and store them as hazardous waste.
- Departments may be charged for the analysis of unknown hazardous waste to determine the chemical identity necessary for proper disposal.

8.2 Accumulation Containers and Labeling

- Containers used to accumulate hazardous waste must be in good condition and comply with the EPA specifications.
- The containers must be clearly and properly labeled and identified. Waste containers must contain the words “Hazardous Waste,” have the chemical components written out, and an accumulation start date. The accumulation start date is the date in which the container is placed in the Central Accumulation Area.
- Containers shall be kept closed except when adding waste.
- All manufacturers’ labels shall be defaced or covered.
- Labels must be visible and legible.
- Labels on containers of potentially explosive materials such as picric acid, silanes, nitro compounds, and ethers must indicate the percent concentration of these chemicals.

- Include any additional hazard information about container contents that may be helpful to waste handlers.

8.3 Filling Containers

- Containers must not be overfilled. Containers for liquids are generally rated by volume capacity. Jugs and bottles should not be filled past the shoulder of the container (where the container sides start to slope in towards the neck). When filling closed head drums larger than 5 gallons, leave approximately four inches of head space to allow for the expansion of the contents.
- Containers for solids are generally rated by their weight capacity and/or volume capacity. Depending on the density of the solid material, the weight capacity of a container could be exceeded if its internal volume were completely filled. This generally is not a problem for jars and open head cans of 5 gallons or less. When filling open head drums larger than 5 gallons, with due consideration to weight, containers for solids can be filled within two inches of the level of the closure.
- Hazardous waste containers will remain closed except when waste is being added or removed as required by Code of Maryland Regulation 26.13.05.09D.

8.4 Satellite Accumulation Areas (SAA)

- SAA are located in various SOS laboratories. Laboratory Services is responsible for the maintenance and housekeeping of all SAA.
- SAA must be located at the point of generation of a hazardous waste and must be under the control of the operator of the process generating the hazardous waste. Hazardous waste containers must be kept in durable, leak proof secondary containers and incompatible hazardous wastes must be segregated.
- The SAA must have signage posted stating:

“Hazardous Waste Accumulation Area”
- SAA cannot accumulate more than 55 gallons of hazardous waste or one quart of acute hazardous waste at any one time.
- When 55 gallons of hazardous waste or one quart of acutely hazardous waste is accumulated within a SAA, or if a waste container is full, that date should be added as the container accumulation start date on the label and the container must be moved to the Central Accumulation Area within 3 days.

- All SAA will be inspected weekly for evidence of leaks or deterioration of containers, correct labeling, and proper segregation. Inspection results or observations shall be recorded on the Weekly Hazardous Waste Inspection Form and maintained on file in the office of the Laboratory Safety Manager.
- Situations requiring corrective action shall be reported immediately to the Laboratory Safety Manager or a member of the Laboratory Services team. Emergency situations (spills or leaks) should be reported to the Laboratory Safety Manager immediately.

8.5 Central Accumulation Areas (CAA)

- The CAA is located in room N162 of the Kevin J. Manning Academic Center and is locked with access only granted to authorized personnel.

Facility Name	Facility Location	Facility EPA ID #	Type of Waste Generator	Location of HazWaste – Central Accumulation Area
Stevenson University	11200 Ted Herget Way, Owings Mills, Maryland 21117	MDR010098432	Large Quantity Generator (LQG)	Academic Center N162

- Secondary Containment (plastic bins or chemical storage cabinets) are required in the CAA to ensure protection against potential spills or leaks.
- Containers that hold incompatible wastes must be separated from each other by means of secondary containment or chemical storage cabinets.
- The secondary containment must have a sufficient capacity for 10% of the stored volume and designed to prevent mixing of incompatible wastes if the containers leak.
- The CAA must have signage posted on all entryways stating:

“CAUTION – Hazardous Waste Storage Area – Authorized Personnel Only”
- The CAA must only hold hazardous waste for 180 days or less per COMAR 26.13.02.05. The Maryland specific regulation states that a generator who accumulates less than 500 kilograms of hazards waste, less than 1 kilogram of acute hazardous waste, and less than 1,000 kilograms of hazardous waste in a calendar month may accumulate for 180 days or less.
- The CAA will be inspected weekly for evidence of container leaks or deterioration of containers, correct labeling, and proper segregation. Inspection results or observations shall be recorded on the Weekly Hazardous

Waste Inspection Form and maintained on file in the office of the Laboratory Safety Manager.

- Situations requiring corrective action shall be reported immediately to the Laboratory Safety Manager or a member of the Laboratory Services team. Emergency situations (spills or leaks) should be reported to the Laboratory Safety Manager immediately.

8.6 Empty Containers

- EPA regulations stipulate that an empty chemical container cannot contain free liquid or solid residue.
- An empty container must be triple rinsed and the label defaced or removed. The lid or cap must be removed prior to the chemical container being disposed of in the regular trash.
- Metal or plastic containers must have a hole punched in the bottom before disposal in the landfill. This action must be taken for all chemical containers before placement in a dumpster, or the container must be treated as hazardous waste.

8.7 Waste Profiles

- A waste profile is a required document by the EPA that provides specific information regarding the waste, such as chemical composition and properties, the Department of Transportation (DOT) description, and the EPA hazardous waste code.
- Contact the Laboratory Safety Manager for information on materials or if there are any questions. The following notes apply:
 - As new waste streams are generated, profiles will be developed through coordinated efforts of the generator of the waste stream, the Laboratory Safety Manager, and contracted waste vendor and Treatment Storage and Disposal Facility (TSDF).
 - Chemical Lab Packs require profiling before shipment.
 - Signed waste profiles are maintained in the Laboratory Safety Manager's office.
 - Waste will not be shipped until Profiles are completed and signed.

8.8 Manifests & Land Bans

- **Signing the Hazardous Waste Manifest**

- Only personnel who have received training in hazardous waste management may sign the manifest. The only SOS personnel trained and authorized to sign Hazardous Waste Manifests are the Laboratory Safety Manager, Director of Laboratory Services, Chemistry Laboratory Manager, and Biology Laboratory Manager.
- **Hazardous Waste Manifest Recordkeeping**
 - A completed manifest is the copy that has been signed by a representative of the TSDF in Block 20. This signifies that the shipment has reached its destination. Once the completed manifest is received, it will be filed in the manifest binder.
 - If a completed manifest is not received back within 35 days, the Laboratory Safety Manager will contact the designated facility (Block 9 and Block H) and determine if the shipment has been received.
 - If the completed manifest is not received back within 45 days, the Laboratory Safety Manager will initiate notification to the Regional Administrator of the United States Environmental Protection Agency to inform them of the discrepancy.
 - When the manifest package is complete, the Laboratory Safety Manager will place this record into the manifest binder.
 - Manifests must be kept for a minimum of three years.
- **Land Ban Forms**
 - All Land Ban Forms are signed at the time the manifest is signed by the same authorized individual. The Laboratory Safety Manager will file the Land Ban Forms in the manifest binder, with the corresponding waste manifests.

8.9 Source Reduction and Hazardous Waste Minimization

- Early federal regulations on disposal of hazardous waste were aimed at controlling pollution of the environment. Today, the focus is shifting from controlling pollution to preventing pollution. The Pollution Prevention Act of 1990 (Federal Regulation) made the prevention of pollution and reduction of waste generation a priority.
- The cost of commercial waste disposal continues to rise and the amount of waste generated continues to increase. Although we cannot control disposal costs, we can reduce the amount of waste generated. Emphasis is placed on

"Front-end Waste Minimization" (reducing the amount and toxicity of hazardous materials used) as the primary means for reducing hazardous waste.

- Research and teaching laboratories should examine their chemical usage and workplace activities to identify potential points of operation where source reduction and waste minimization can be implemented.
- Waste Source Reduction and Waste Minimization Techniques and Procedures
 - The SOS utilizes a chemical inventory management system to control the purchase and stock of chemicals on site. It is important to maintain current inventories of chemical stocks to prevent the ordering of chemicals that may already be in stock and monitor the shelf life of remaining chemicals. It also reduces "warehousing" and promotes the sharing of chemicals.
 - All SOS chemicals are added to the chemical inventory and barcoded upon arrival to campus.
 - All SOS chemicals are designated by sharing status upon arrival:
Green sticker – Shared
Yellow sticker – Ask before use
Red sticker – Do not use
 - All chemicals must have a label that adheres to all Federal and State regulations. All secondary containers within the SOS must have a complete NFPA diamond label. Replace all deteriorating labels on primary and secondary containers.
 - Chemicals should be purchased in quantities that are appropriate to the scale of the experiment being conducted. Limit acquisition of chemicals to quantities required for immediate use and do not order quantities to obtain a special unit cost savings. This savings will normally be lost due to eventual disposal costs if the chemical is not entirely used.
 - Substitute less hazardous chemicals whenever possible.
 - Rotate chemical stocks in order to use chemicals before their shelf lives expire.
 - Minimize the use of heavy metal chemicals (silver, chrome, mercury, barium, cadmium, and lead).
 - Substitute alcohol or electronic thermal monitors for mercury thermometers.

- Use No-Chromix detergents or enzymatic cleaners instead of sulfuric/chromic acid cleaning solutions for cleaning laboratory glassware.
- Minimize solvent waste by recycling or substitution.
- Pre-weigh chemicals for undergraduate use to reduce spills and waste generation.
- Prevent the mixing of different types of waste. Do not put non-hazardous waste, such as a mixture of water, sodium bicarbonate, and acetic acid, into a waste container of hazardous waste. Do not put inorganic heavy metal waste in with solvents. This increases disposal costs. Segregate halogenated waste solvents from non-halogenated waste solvents.
- Keep waste streams segregated by storing them in separate waste containers. Label waste containers with the term “hazardous waste”, full name(s) of the waste material(s) stored in them, and date. Keep the waste containers stored separately from reagent containers still in use to avoid accidental contamination of the reagent chemicals.
- Neutralize dilute acids and bases as part of the experimental protocol, making them non-hazardous and potentially suitable for drain disposal.
- When possible, redesign experimental protocols so that harmful byproducts are detoxified or reduced in volume as a final step.
- When possible, obtain compressed gases from vendors who will accept return of their empty or partially full cylinders.
- Include waste generation as a criterion in equipment selection.

9.0 EMERGENCY PROCEDURES

9.1 Chemical Spill or Leak

- A spill or leak is defined in this Plan as an unexpected release of any hazardous material from a container.
 - For operational purposes, spills of any hazardous material should be reported to the Laboratory Services Team for procedural determination.
 - The Laboratory Services Team will determine which of the three (3) categories the spill or leak falls into:
 - Level 1 Incident – Safe for Faculty or Staff to clean up

- Level 2 Incident – Safe for the Laboratory Services Team to clean up
 - Level 3 Incident – Utilize outside resources (Triumvirate Environmental and/or the Baltimore County Fire Department Hazardous Materials Unit)
- Many chemical spills can be avoided by good housekeeping and best management practices. Faculty, staff, and students should be familiar with emergency procedures in order to prevent and reduce the impact of laboratory accidents. Always review the Safety Data Sheet before working with any chemical to ensure familiarity with associated hazards and emergency response procedures.
 - Chemical spills consisting of volatile, flammable materials need to be handled by faculty and staff that are trained to handle spills. All flames should be extinguished immediately. All electrical apparatus should be turned off and the room evacuated while spill clean-up is in progress.

9.2 Spill Classification Criteria for Cleanup Procedures

9.2.1 Evaluate the risks

- Human health effects – This is the most important hazard category to consider when deciding to perform a spill cleanup. Some chemical releases may result in health hazards such as fires or explosions. Other chemical releases may present health threats because of their ability to spread rapidly and enter the body readily.
- Physical damage to property – The potential for physical damage to property, such as equipment, building materials, structures, or cleanup materials is important to consider when deciding to perform a spill cleanup. Do not attempt to protect property if there are any human health or fire/explosion hazards present.
- Environmental threat – Some spills have the potential of reaching and harming the environment. Spills may release into the atmosphere, discharge into the sewer, or leak directly into soil or surface waters. If possible, block the spreading of the spilled material to the environment prior to notifying the Baltimore County Fire Department Hazardous Materials Unit and the Maryland Department of Environment.

9.2.2 Evaluate Quantity

- If a spilled chemical is hazardous, the cleanup depends on the spilled chemical's physical properties and hazards. The quantity depends on situational factors such as:
 - Training and experience of laboratory personnel.

- Availability of spill control materials.
- Availability of personal protective equipment.
- Physical layout of the spill location.
- The more toxic, corrosive, or flammable a material is, the more dangerous the cleanup will be.

9.2.3 Evaluate Potential Impacts

- Evaluate the potential broader impacts of the spill. A chemical spill in an area where its potential risks are magnified by specific situations may include:
 - Large numbers of people.
 - Physical barriers.
 - The possibility that hazardous vapors or dusts might enter the building's ventilation system.
 - The presence of incompatible chemicals.
 - The proximity of offices or classrooms containing people who could be harmed by the spill.
 - The possibility that spilled liquids may flow into other areas, thus expanding the threat of harm.
 - Spills in the sink that might be connected to other sinks through the plumbing system.

9.3 Chemical Spill or Leak Response Procedures

- Any spill or slow leak should be reported to the Laboratory Services Team for procedural determination.
- If the Laboratory Services Team determines that the spill or leak is a Level 1 Incident, the Faculty or Staff member can clean up the spill or leak at his or her discretion, following the instructions outlined in the appropriate Safety Data Sheet. The employee will be informed if they must fill out a Spill Report Form (found in Appendix B of this Plan) and submit it to the Laboratory Safety Manager.
- If the Laboratory Services Team determines that the spill or leak is a Level 2 Incident, the Laboratory Services Team will clean up the spill following the instructions outlined in the appropriate Safety Data Sheet, as well as utilizing methods obtained during training. All other faculty, staff, and students should leave the immediate area and follow Campus Security and the Laboratory Services Team's directions until the problem is corrected and safe conditions are restored. Potential reporting to State and Federal Government may be required by the Laboratory Safety Manager. The remaining Laboratory Services Team Members will act as alternates to notify the appropriate agency if the Laboratory Safety Manager is unable to notify.

- If the Laboratory Services Team determines that the spill or leak is a Level 3 Incident, the Laboratory Services Team will utilize outside resources to clean up the spill. The Laboratory Services Team will contact Triumvirate Environmental and/or the Baltimore County Fire Department Hazardous Materials Unit for assistance. All faculty, staff, and students should leave the immediate area and follow Campus Security and the Laboratory Services Team's directions until the problem is corrected and safe conditions are restored. Potential reporting to State and Federal Government may be required by the Laboratory Safety Manager. The remaining Laboratory Services Team Members will act as alternates to notify the appropriate agency if the Laboratory Safety Manger is unable to notify.

9.4 Level 1 or 2 Incidents – Fighting the Spill or Leak

- Identify the spilled material using the Safety Data Sheet (SDS) and container label and if possible to do safely, remove any documentation from the container to a safe location.
- When confronting a chemical release, personal protective equipment must be worn to avoid chemical contact with the skin. Leave the immediate area before donning appropriate personal protective equipment (e.g. eyes, face, hands) as advised by the Safety Data Sheet (SDS).
- It is recommended to wear two sets of gloves; the inner liner to prevent contamination should the primary barrier fail. Silver shields are the recommended exterior glove. Most nitriles would be acceptable as an inner liner. Refer to the SDS or SU's Glove Selection Guide for assistance in glove selection.
- Select the appropriate spill-fighting equipment and agents (as recommended on the SDS).
- Contain the spill by diking it with the appropriate spill containment material (as recommended on the SDS).
- Absorb all free liquid with the appropriate absorbent materials (as recommended on the SDS).
- Follow any instructions (identified on the SDS) for the neutralization or detoxification of any spilled hazardous materials.
- Thoroughly decontaminate the area as recommended by the manufacturer's directions or utilize a certified hazardous waste cleanup company to complete this task.

- Place all spill cleanup materials into an appropriate disposal container. The Laboratory Services Team will properly dispose of any materials.
- The Laboratory Services Team should clean, repair, recondition, or properly dispose of all used emergency response equipment.
- The Laboratory Services Team must deem the area as safe before it is returned to normal use.
- A hazardous materials spill report form must be completed noting all spills and detailing the cleanup and abatement operations (The Spill Report Form can be found in Appendix B of this Plan). A copy of this report must be filed with the Laboratory Safety Manger.

9.5 Spill or Leak Reporting Procedures

Any spill or release of a hazardous substance equal to or in excess of its reportable quantity must be reported to the Maryland Department of Environment as soon as practicable, but no later than two (2) hours and the National Response Center as soon as practicable, but no later than twelve (12) hours by the Laboratory Safety Manager. The remaining Laboratory Services Team Members will act as alternates to notify the appropriate agency if the Laboratory Safety Manger is unable to notify.

- Maryland Department of Environment
– Hazardous Materials and Oil Spills Reporting 1-866-633-4686
- National Response Center 1-800-424-8802

9.6 Fire or Explosion Response Procedures

- In case of a fire or explosion, sound the fire alarm to notify others in the building.
- Leave the area immediately through the nearest safe exit. Proceed to the set assembly area for the building and call Baltimore County Fire Department via 911. Report the incident to Campus Security at (443) 352-4500. Faculty, staff, and students should meet at the assembly areas, which are based on location at the time of alarm.
 - Assembly Area 1 – Grass area across from the Academic Center and School of Design front parking lots
 - Assembly Area 2 – Grass area next to the Facilities trailer
 - Assembly Area 3 – Grass area in the back parking lot
 - Assembly Area 4 – Grass area south of the fence line

- Assembly Area 5 – Grass area between the Academic Center and School of Design buildings
- Whenever a fire or explosion threatens, the Laboratory Services Team will leave the control of the situation to the most qualified firefighter available and will provide any chemical and/or safety advice that he/she is able to acquire from the chemical inventory, SDS, or other applicable resources, such as the Hazardous Materials, Substances, and Wastes Compliance Guide or the Emergency Response Guidebook.
- After the fire is extinguished, the area must be carefully checked for any chemical hazards and decontaminated if necessary. The Laboratory Services Team is responsible to ensure the extent of the threat is limited and cleanup and decontamination procedures are followed in a consistent manner.

9.7 Personal Injury or Illness

- If an injury involving a hazardous material occurs, Campus Security and the Laboratory Services Team must be notified. The victim is to be taken to the nearest hospital or urgent care facility. The following information must be sent with the victim:
 - Identity of hazardous material and the SDS.
 - Estimated quantity of material involved in the incident.
 - Time and location of the incident.
- The Laboratory Services Team will assist the hospital or urgent care facility staff with information concerning the material(s) involved and its hazards.
- The Laboratory Services Team is required to perform a complete inspection of the facility to ensure that the accident resulting in the personal injury has not created a situation which could result in further harm to human health and/or the environment. Any such situation must be resolved immediately.
- If an individual becomes ill as a result of acute or chronic exposure to a hazardous material, he/she must be removed from the area for the duration of the illness. All appropriate medical help must be obtained, including consultation with an Industrial Hygienist, Toxicologist, or other professionals as deemed necessary.

10.0 TRAINING

- Documented training is required for personnel involved in the management of hazardous wastes.
- Training records shall be maintained in the office of the Laboratory Safety Manager.

- Training includes proper management of the waste streams, labeling, containers, and emergency procedures outlined in the Chemical Hygiene Plan.
- Hazardous waste handlers and their supervisors/managers must complete classroom training and on-the-job instruction relevant to their duties to include hazardous waste management procedures and emergency response procedures.
- Training must be completed before duties are assigned and annually thereafter.

11.0 PLAN REVIEW

The following items will be reviewed annually for compliance and necessary improvements:

- Hazardous Waste Management Plan.
- Inspection records of the Central Accumulation Area and the Satellite Accumulation Areas.
- Manifests (for signatures, return copies) and Land Ban Forms.
- Waste Minimization Procedures.

12.0 REFERENCES

- Maryland Department of the Environment - Title 26, Subtitle 13 of the Code of Maryland Regulations (COMAR 26.13)
- Environmental Protection Agency
- Resource Conservation and Recovery Act of 1979 (RCRA)
- Hazardous and Solid Waste Amendments of 1984
- Code of Federal Regulations, Title 40, Part 260 to Part 299
- University of Maryland Baltimore County, Hazardous Waste Disposal Guidelines.

APPENDIX A

RCRA's Chemical Waste Compatibility List

The mixing of Group A materials with Group B materials may have the potential consequences noted.

Group 1-A

Acetylene sludge
Alkaline caustic liquids
Alkaline cleaner
Alkaline corrosive liquids
Alkaline corrosive battery fluid
Caustic wastewater
Lime sludge and other corrosive alkalies
Lime wastewater
Lime and water
Spent caustic

Group 1-B

Acid sludge
Acid and water
Battery acid
Chemical cleaners
Electrolyte, acid
Etching acid liquid or solvent
Pickling liquor & other corrosive acids
Spent acid
Spent mixed acid
Spent sulfuric acid

Potential consequences: Heat generation; violent reaction

Group 2-A

Aluminum
Beryllium
Calcium
Lithium
Magnesium
Potassium
sodium
Zinc powder
Other reactive metals and metal hydroxides

Group 2-B

Any waste in Group 1-A or 1-B

Potential consequences: Fire or explosion; generation of flammable hydrogen gas

Group 3-A

Alcohols
Water

Group 3-B

Any concentrated waste in Groups 1A or 1B
Calcium
Lithium
Metal hydrides
Potassium
SO₂Cl₂, SOCl₂, PCl₃, CH₃SiCl₃
Other water-reactive waste

Potential consequences: Fire, explosion, or heat generation; generation of flammable or toxic gases

Group 4-A

Alcohols
Aldehydes
Halogenated hydrocarbons
Nitrated hydrocarbons
Unsaturated hydrocarbons
Other reactive organic compounds & solvents

Group 4-B

Concentrated Group 1-A or 1-B wastes
Group 2-A wastes

Potential consequences: Fire, explosion, or violent reaction

Group 5-A

Spent cyanide and sulfide solutions

Group 5-B

Group 1-B wastes

Potential consequences: Generation of toxic hydrogen cyanide or hydrogen sulfide gas

Group 6-A

Chlorates
Chlorine
Chlorites
Chromic acid
Hypochlorites
Nitrates
Nitric acid, fuming
Perchlorates
Permanganates
Peroxides
Other strong oxidizers

Group 6-B

Acetic acid and other organic acids
Concentrated mineral acids
Group 2-A wastes
Group 5-A wastes
Other flammable and combustible wastes

Potential consequences: Fire, explosion, or violent reaction

APPENDIX B

Spill Report Form

STEVENSON UNIVERISTY SPILL REPORT FORM

Date: _____ Prepared By: _____

Date and Time of Spill: _____

Location of Spill: _____

Written Description of Spill: _____

Possible Affected Water Bodies: _____

Suspected Quantity of Spilled Material: _____

Description of Spilled Material: _____

Corrective Actions Taken: _____

Plan for Preventing Recurrence: _____

Agency	Phone Number	Date	Time
SU Laboratory Safety Manager	443-394-9757		
SU Director of Laboratory Services	443-394-9648		
Triumvirate Environmental	410-636-3700		
Baltimore County Fire Department (Hazardous Materials Unit Brooklandville Station 14)	911		
Maryland Department of Environment	866-633-4686		
National Response Center	800-424-8802		

* Please list the dates and times when an individual or agency was contacted regarding this spill.