1.0 Purpose, Applicability, and Scope

1.1 Purpose-The purpose of these guidelines are to provide a framework for managing hazardous waste on campus, with special emphasis on the areas of the theater and art.

1.2 Applicability- This policy applies to all faculty, staff and students in the Art and Theater Departments.

1.3 Scope- This policy applies to all hazardous waste, as defined in Section 2.2

2.0 Abbreviations, Acronyms, and Definitions

2.1 DOT – Department of Transportation
EHS – Environmental Health and Safety
RCRA-Resource Conservation and Recovery Act
SAA-Satellite Accumulation Area
TDEC-Tennessee Department of Environment and Conservation

2.2 Definitions

Hazardous Waste – The EPA defines hazardous waste as a material that no longer has an intended value with properties that make it dangerous or potentially harmful to human health or the environment. Hazardous wastes can exist as liquids, solids, contained gases, or sludges. They can be the by-products of manufacturing processes or simply discarded commercial products, like cleaning fluids or pesticides. In regulatory terms, a RCRA hazardous waste is either a listed waste that appears on one of the four hazardous wastes lists (F-list, K-list, P-list, or U-list), and/or exhibits at least one of four characteristics—ignitability, corrosivity, reactivity, or toxicity. Hazardous waste is regulated under the Resource Conservation and Recovery Act (RCRA) Subtitle C, which is enforced by the EPA on a federal level, and by TDEC on a state level.

3.0 Roles and Responsibilities

a. Generator Responsibility

It is the responsibility of Art, Architecture and Theater Department personnel to identify and properly manage hazardous waste to meet federal, state, local and UTK regulations and requirements. It is also the department’s responsibility to minimize the generation of
hazardous waste whenever possible. EHS will provide assistance in other to ensure compliance with applicable regulations.

4.0 Procedure

Section I- General Information

Many disciplines within the art and theater departments do activities that generate hazardous waste. Some of these activities include: painting, photography, sculpture, and graphic design. Some of the waste generated at the Art and Architecture Building and the Clarence Brown Theater cannot be discarded into the general trash. Instead, this hazardous waste must be properly managed following state and federal regulations. These guidelines outline procedures for those types of wastes to ensure compliance with federal and state regulations and UTK requirements.

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Ignitable waste includes any flammable waste that has a flashpoint <140°F. Examples include: acetone, toluene, xylene and mineral spirits. This also includes oxidizers, such as ammonium nitrate. Corrosive waste includes any waste with a pH of <2 or > 12.5. This includes acids, such as nitric acid, hydrofluoric acid and bases, such as sodium hydroxide. Reactives include any waste that is water-reactive, spontaneously combustible (linseed oil), air-reactive, etc.. Toxics include waste such as metals (mercury, lead, chromium, silver), methylene chloride, and many others.

A. Types of Hazardous Waste

Below is a list of typical types of hazardous wastes that are generated in Art, Architecture and Theater (this list does not include every type). The following items should not be discarded in the regular trash or down the drain. If there is a question whether a material
is hazardous waste, please contact EHS for guidance. It is best to assume a material is a hazardous waste if unsure.

Adhesives: Solvent-based adhesives should be collected and disposed through EHS. This includes compressed tanks filled with adhesives.

Aerosol Cans: Please do not throw aerosol cans in the regular trash. EHS will collect empty aerosol cans. Please collect aerosol cans in garbage bags and EHS will collect. EHS punctures the cans & the liquids are drained and collected as hazardous waste. The emptied cans are sent to a steel recycler.

Ceramic Glazes: Many ceramic glazes contain heavy metals (i.e. barium, chromium, lead) that are regulated as hazardous waste. Any unused materials and drippings should be collected and disposed of through EHS.

Corrosive chemicals (i.e. nitric acid used in etching): Should be managed and disposed of through EHS. Do not dump these items down the drain.

Gas Cylinders: EHS recommends that gas cylinders should be rented and not purchased. However, if a gas cylinder has been purchased and needs disposed, it should be managed through EHS. Examples include helium, acetylene and oxygen cylinders.

Ink: Any solvent-based/or oil-based inks should be collected and disposed through EHS.

Linseed Oil and other Natural Oils: Collect in a closable container, label and dispose of through EHS.

Oils (petroleum and synthetic): Collect in a closable container, label as “Used oil” store in SAA and dispose of through EHS. This oil will be recycled, so do not mix with other waste.

Oily Rags: Collect in a closable container, label as used oil store in SAA and dispose of through EHS. Do not ever leave oily rags lying on the floor. Linseed oil, in particular, can spontaneously combust, causing fire.

Paints: Latex or oil-based paints must be labeled, stored in SAA and disposed of through EHS. Art paints should be managed as hazardous waste if they contain heavy metals (vermillion paint contains mercury), or contain solvents.

Photographic Waste: Most fixers contain silver, which must be either managed as a hazardous waste or sent for silver recovery. Many developing solutions and powders are often highly caustic. Sometimes, glacial acetic acid is used in making the stop baths (very acidic and flammable), and some used potassium chromium sulfate as a hardener, which is a hazardous waste due to the chromium levels. Care must be taken to read product labels and ensure that any hazardous waste generated is disposed. Also, any rinsate generated from photo processing with a hazardous chemical must also be managed as a hazardous waste.
Sharps: Sharp objects that are not a biohazard, such as razorblades, broken glass, and knives should be placed in a puncture proof container and disposed of in the dumpster.

Solder Waste: In some cases, solder dross contains lead or cadmium. Any waste solder waste containing lead or cadmium must be managed as a hazardous waste.

Solvent contaminated Rags: Rags contaminated with solvents, such as mineral spirits or turpentine should be disposed of in the red safety cans. These cans should be emptied nightly, or when full into the 55-gallon waste drums for solvent rags. Rags and papers must not be left in these cans overnight.

Solvent waste (mineral spirits, turpentine, paint thinners, stains, etc..): Solvents should be managed as a hazardous waste and disposed of through EHS. Solvents should not be poured down the drain.

Unused materials (i.e. paint thinner, glazes, nitric acid, etc..). If the materials are unused and unopened, and the product has not expired, then find another class or department who can use the material. Or, contact EHS, and they can either place the unused chemical in their chemical exchange program, or dispose of the materials (depending on whether the shelf life of the product has expired, etc..)

**Container Management**

Waste chemicals must be collected in individual, leak-proof, sealed containers. The chemicals must be compatible with container material (i.e. acids must not be placed in a metal container). Glass may be safely used for virtually anything except hydrofluoric acid, acid fluoride salts, and very strong alkalis. Metal containers should not be used for acid storage.

The container should remain closed, except when adding waste, should be clean of waste on the outside and should be leak proof (if tipped over the contents will not spill). Also, pay attention when pouring waste to an existing waste container and make sure you will not add a constituent that will react with the contents already present in the waste container. All containers must be closed with a tight-fitting lid. It is illegal to store waste in an open container.

**Label Management**

Ensure all hazardous waste containers are properly labeled with UT’s hazardous waste label (labels can be obtained by contacting EHS at 974-5084 or a supply is stored in the flammable cabinet on the 4th floor of the Art & Architecture building). A waste label should be completed and placed on the waste container as soon as waste is added to the container. You should write out the chemical name on the label in English. Please do not use abbreviations, formulas or general nomenclature. Do not add a date to the waste label.
Hazardous waste should be stored in the same manner as hazardous chemicals. Incompatible chemicals should be stored separately (i.e. flammables separated from oxidizers), and placed in secondary containment (tubs or dishpans work well for secondary containment). Check the EHS web-site for a list of incompatibles, or contact EHS for guidance.

Storage

Hazardous waste should be segregated and stored by waste type (i.e. flammables, acids, toxics, etc..) and arranged so that incompatible substances cannot mix. Incompatibles are pairs of substances that, when mixed, either react violently, or evolve flammable or poisonous gases or vapors. Incompatible chemicals should be stored separately (i.e. flammables separated from oxidizers; acids separated from bases), and placed in secondary containment (tubs or dishpans work well for secondary containment). Check the EHS web-site for a list of incompatibles, or contact EHS for guidance.

No more than 55 gallons of hazardous waste (or 1 kilogram of acutely toxic waste) can be stored in your SAA. If > 55 gallons of hazardous waste are generated, then you have three days to remove the waste from the SAA. Once the waste containers are full, or if you are not going to generate more of the waste stream, please contact EHS at 974-5084 to coordinate a pickup. For a complete list of acutely toxic substances, please refer to the EHS web-site.

Spills

Spilled hazardous materials should be properly cleaned up immediately wearing appropriate PPE. Any materials used to clean the spill (i.e. towels, rags, etc), must be managed as hazardous waste. If you do not feel comfortable cleaning up a hazardous material spill, please call EHS for assistance.

Empty Containers

Empty containers (bottles, cans, jars, bags, etc) that once held a hazardous substance may be discarded in the regular trash and are not considered hazardous waste, as long as:

- No more than 1 inch of product residue remains in container
- No more than 3% by weight of the product remains (containers <110 gallons)
- Make sure to deface all markings on container before discarding.

General Guidelines

a. Hazardous waste should never be disposed of down the sanitary sewer, the storm sewer, placed in the regular trash, by evaporation (a container without a lid implies evaporation for volatile substances), mixing with a biohazard, or mixing with a non-hazardous substance (i.e. dilution).
b. The following items are not classified as hazardous waste and are not included in these guidelines: sewage; regular trash; universal waste (fluorescent bulbs, batteries); radioactive and biohazard.

c. The burden of hazardous waste determination lies with the waste generator. If unsure whether a waste is hazardous, reviewing the material safety data sheet (MSDS) or original container labels are good starting points. Unlabeled containers present a number of problems. When in doubt, assume the waste is hazardous and manage as a hazardous waste. EHS should be consulted with any questions concerning hazardous waste determinations.

**Section III: Waste Minimization**

Every effort must be made to minimize and reduce the volumes of hazardous waste generated on campus. Here are some examples of waste minimization practices. Also, refer to UTK’s Hazardous Waste Minimization Plan on the EHS web-site for more ideas on waste reduction.

- Only purchase the amount of materials needed to complete a project. In many cases, the cost for disposal is more than the original purchase price of the product.
- Purchase nontoxic, non-hazardous alternative products (see Table 1 for examples).
- Please reuse or recycle materials whenever possible.
- Donate unused and or unwanted chemicals to other departments or contact EHS to include in the chemical exchange program.
Table 1: Non-hazardous Alternatives

<table>
<thead>
<tr>
<th>Item</th>
<th>Alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barium Carbonate</td>
<td>Strontium Carbonate</td>
</tr>
<tr>
<td>Cadmium Vermillion Red Paint; True Vermillion Paint</td>
<td>Mercury and cadmium free paint</td>
</tr>
<tr>
<td>Ceramic Glazes</td>
<td>Lead and cadmium free dyes</td>
</tr>
<tr>
<td>Chromium Pigment Powders</td>
<td>Prussian Blue or Mars Yellow</td>
</tr>
<tr>
<td>Dyes (Cold water and commercial)</td>
<td>Vegetable Dyes</td>
</tr>
<tr>
<td>Solvent-base glues, paints, wood stains</td>
<td>Water-based products</td>
</tr>
<tr>
<td>Polymer Clay (designed to harden at conventional oven temperatures)</td>
<td>Paper-based, flour-based or wax-based clays</td>
</tr>
<tr>
<td>Stained-Glass Solders</td>
<td>Lead-free solder</td>
</tr>
</tbody>
</table>

Table II: Waste Minimization Methods for Photo processing

<table>
<thead>
<tr>
<th>Waste Streams</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aqueous Waste</td>
<td>➢ Use Squeegees to minimize chemical carryover</td>
</tr>
<tr>
<td></td>
<td>➢ Recover silver from effluent</td>
</tr>
<tr>
<td></td>
<td>➢ Reuse Fixer</td>
</tr>
<tr>
<td></td>
<td>➢ Regenerate developer and bleach</td>
</tr>
<tr>
<td></td>
<td>➢ Use counter current rinsing</td>
</tr>
<tr>
<td>Expired or Off-Spec</td>
<td>➢ Control Inventory Carefully</td>
</tr>
<tr>
<td>Chemicals</td>
<td>➢ Use “First In-First-Out” method</td>
</tr>
<tr>
<td></td>
<td>➢ Store Chemicals away from heat</td>
</tr>
<tr>
<td>Solid Waste</td>
<td>➢ Store paper at cool temperature</td>
</tr>
<tr>
<td></td>
<td>➢ Recover silver from off-spec paper and from excess film</td>
</tr>
<tr>
<td></td>
<td>➢ Store chemicals away from heat</td>
</tr>
<tr>
<td>Air Emissions</td>
<td>➢ Use floating covers on solution tanks</td>
</tr>
</tbody>
</table>
Section IV- Acronyms

EPA: Environmental Protection Agency

TDEC: Tennessee Department of Environment and Conservation

EHS: Environmental Health and Safety

SAA: Satellite Accumulation Area