HAZARDOUS MATERIAL GUIDELINES

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I. INTRODUCTION

If more than one hazardous material abatement is required, the following plan must be completed prior to demolition:

Demolition Plan for Renovation of facilities containing multiple hazardous materials: This document outlines the demolition process by which hazardous materials will be removed from the facility prior to and during the renovation work starting _____.

General demolition work will be considered and integrated into this hazardous materials demolition plan.

In order of authority the following will supervise and legally monitor the hazardous materials removal.

UNC Environmental, Health and Safety Department.

Professional Monitors (Certified Industrial Hygienist)_____ (asbestos, lead, and mercury wastes)

Professional Monitor (Certified Industrial Hygienist) _____ (radioactive contaminated materials.)

Designer_____.

Four hazardous materials, requiring special approvals and techniques, will be removed (abated):

Asbestos, Lead, Mercury, radioactive contaminated equipment and ductwork.

The following contractors will be employed to remove the respective hazardous materials.

Asbestos _____

Lead _____

Mercury _____

Radioactive Contaminated materials _____

UNC Environmental, Health and Safety will oversight and document the activities of all hazmat (hazardous material) contractors, consultants, and the location and legal disposal of a hazmat materials. At the conclusion of the project demolition phase, EHS will also issue a final clearance document for each of the hazmat types in order for further demolition / construction work to be performed.

The first hazardous material type to be removed is asbestos. This material removal is expected to begin starting _____.

The second hazmat type to be removed is lead. This material removal is expected to begin starting _____.

The third hazmat type to be removed is mercury. This material removal is expected to begin _____.

The fourth hazmat type to be removed is radioactive materials. This material removal is expected to begin _____.

The consultant monitoring professionals will provide documentation for the monitoring of hazmat presence, contractor qualification, removal procedures, and worker protection and exposure. In addition all other legally required abatement documents will be the responsibility of the contracted monitoring professional. Copies of all document issued by the monitoring professionals during the course of abatement will be delivered to EHS for their review.

As each material type is fully abated, the monitoring professional will certify to that fact and EHS will confirm by noting EHS review of the documents and EHS concurrence.

EHS will issue a final report document that summarizes the location, type, amounts, and final disposal of the listed hazardous materials. EHS will all note its concurrence with the opinion of the monitoring professionals that the hazardous materials have been safely removed and legally disposed. The architect will include this document with the final report.

This outline plan and the supporting procedural methodologies for each type of hazardous material is the sum of the Hazardous Materials Demolition Plan. Each concurring party agrees with the elements and requirements of this plan.

Concur: _____

Environmental Health and Safety

_____

Monitoring Professional

_____

Monitoring Professional

_____

Asbestos Abatement Contractor

_____

Lead Abatement Contractor

_____

Mercury Abatement Contractor

_____

Radioactive Materials Abatement Contractor

A. ASBESTOS CONTAINING BUILDING MATERIALS

1. Asbestos Regulations and Standards

The architects and contractors are responsible to comply with all applicable regulations and obtain the required permits for removal and disposal.

Applicable regulations and standards are listed below:

a) 29CFR 1926.1101 (OSHA Construction Industry Asbestos Standard)
b) 29CFR 1910.1001 (OSHA General Industry Asbestos Standard)
c) Asbestos Hazard Management Program, 10 NCAC 19C section .0600
d) EPA Publication 600/4-85-049, Nov 1985, Measuring Airborne Asbestos
e) Following an Abatement Action
f) NIOSH Method 7400 "fibers" 3rd revision, 2nd issue
g) EPA 340/1-90-007 NESHAP, Demolition and Renovation Inspection Procedures
h) Asbestos Abatement Guidelines and Policies, 1996, State of North Carolina, Department of Administration, State Construction Office

2. Design of Asbestos Removal Projects

The EPA NESHAP regulation covers the demolition asbestos containing building materials (ACBM). An architect or designer for a project must inspect the facility to identify all ACBM for the project. If asbestos will be disturbed during the project then this material must be removed. The architectural firm must hire an environmental firm to conduct a survey for ACBM. The survey is to be comprehensive and is to include all ACBM.

Based upon building history, drawings and construction, the asbestos building assessment must include an estimate of "hidden" asbestos content. If walls, chases and ceilings will be breached or demolished during the planned renovation project, these areas must be evaluated, documented and included in the abatement project plans. An accredited asbestos designer uses the asbestos survey to develop plans for the asbestos removal aspects of the project. EHS is to be provided with both a copy of the ACBM survey results and the design for the asbestos removal project in the building.

3. Asbestos Removal

The industrial hygiene oversight firm hired to monitor the project must be hired by the University, rather than the contractor. EHS must be notified of pre-construction meetings that involve the asbestos removal and of the scheduling as to when the removal will be conducted. Industrial Hygiene firm should coordinate their oversight activities with EHS. The oversight firm will conduct inspections and air monitoring to protect the public from exposure to asbestos. The oversight firm will verify demolition and renovation operations are in accordance to the design specification and with all applicable regulations. Any evidence of violations of the regulations will be reported immediately to EHS. The final IH report is to confirm or revise the designer's statements as to what ACBM has been removed and what ACBM has remains in the building. A copy of the final IH report of the project will be sent to EHS.

4. Final Documentation of Removal-Building Drawings

The architect must clearly mark the final as-built drawings for the project to illustrate where ACBM remains in the building. The drawings should clearly differentiate between areas where asbestos is known to be present based upon visual observation and those areas where it is suspected to remain but was never confirmed because the area was untouched by the renovation project.

B. EHS GENERAL PROCEDURES FOR PAINT FILM STABILIZATION

1. Definition:

Paint film stabilization is the systematic repair and restore of damaged paint. This is a process of wet scraping, priming, and repainting surfaces that are coated with deteriorated lead-based paint.

2. Objective:

To guide the workers in the safe management of lead-based paint (LBP) commonly encountered during the paint film stabilization of University buildings. The procedures will help the workers to:

a) Control the creation of lead-contaminated dust.
b) Effectively clean up lead-contaminated dust and debris created by the work being done.
c) Protect workers, and occupant's health and safety.

3. Performance:

A moderate amount of lead-contaminated dust and debris will be generated or disturbed during paint film stabilization work at University buildings. A moderate amount is clearly visible and may contain debris and paint chips. These quantities of paint chips may be regulated as hazardous waste.

a) Four important rules to follow when chipping loose paint:
b) Mist the work area to minimize airborne dust.
c) Using a putty knife or scraper, carefully scrape loose paint flakes and deteriorated surface.
d) Collect all debris and paint chips created on 6-mil plastic sheeting and place in waste drum.
e) Vacuum the entire work area thoroughly using a HEPA vacuum.

4. Personal Protective Equipments:

Personal protective equipment includes protective clothing and respirators are to be used in all projects. Protective clothing is worn to prevent lead from coming into contact with the body. Protective clothing includes coveralls, head covering, foot covering, and gloves. Respirators should always be used; typically a half face HEPA filter air-purifying respirator is to be used in all paint film stabilization. Powered air purifying respirators (PAPR) should be provided if requested by an employee for use where respirators are required.

5. Personal Hygiene:

All workers should wash their hands and face immediately after every project. Eating, drinking, smoking, and applying cosmetics should not be permitted in any work area.

6. Equipment:

a) Cleaning supplies, such as cloths, mop and bucket.
b) Misting or spray bottles.
c) Tape and plastic drop cloths and 6-mil plastic sheeting
d) High Efficiency Particulate Air (HEPA) filter-equipped vacuum cleaners.
e) Putty knives or scrapers.
f) Personal Protective Equipment (PPE), such as; full Tyvek suite, disposable Gloves, respirators with HEPA cartridges, and safety glasses.

7. Preparation:

a) For Exterior Surfaces:

i. Cover ground under work area with polyethylene sheeting.
ii. Attach edge of ground polyethylene sheeting to building.
iii. The polyethylene sheeting should extend ten feet beyond the perimeter of the working surfaces.
iv. Mist the work surfaces; use a putty knife or scraper to remove all loose paint.
v. Maintain good housekeeping duties throughout the work.
vi. Remove debris and paint chips at frequent intervals, place in waste drums.
vii. Limit access through the work area, a tape "barricade" may be placed to help control traffic.

b) For Interior Surfaces:

i. Move furnishings and equipment away from area of work.
ii. Place plastic drop cloth over fixed in place equipment or furnishings.
iii. Place 6-mil plastic sheeting on the floor under area of work extending five (5) feet.
iv. Mist the work surfaces; use a putty knife of scraper to remove all loose paint.
v. Maintain good housekeeping duties throughout the work.
vi. Remove debris and paint chips at frequent intervals, place in waste drum.
vii. Limit access through the work area, a tape "barricade" may be placed to help control traffic.

c) Cleaning Work Area:

i. After completing the work, remove polyethylene sheeting contaminated with lead paint chips and place it in a 55-gallon drum provided by the Department of Environment, Health & Safety.
ii. Plastic sheeting should be rolled inward and placed in disposable bags with other waste.
iii. Waste generated during repair & restore of deteriorated lead-based paint work may be regulated as hazardous waste.
iv. Call the Department of Environment, Health & Safety to arrange for waste pick-up.

C. INDUSTRIAL HYGIENE DESIGN GUIDELINES

Duct work is to be insulated on the exterior of the ducts. No interior lined insulation is to be used.

For heat recovery systems from remote maintenance where feasible. If not feasible, provide supplied air for respiratory protection for buildings with heat recovery, for protection of maintenance workers who must enter contaminated air flow plenums.

Do not provide building humidification, unless required for special equipment or materials. Only direct steam injection systems are permitted with downstream condensate detection in the duct work.

D. LEAD BASED PAINT MANAGEMENT FOR RENOVATIONS/DEMOLITION OF EXISTING BUILDINGS

All renovation projects must be reviewed by the Department of Environment, Health & Safety (EHS) prior to starting them.

For large capital projects, EHS can provide information on preliminary building lead assessments. However, a complete lead assessment must be completed as part of the building renovation by a contractor certified to perform lead assessments.

For small projects, the EHS Office can test surface finishes for lead content. Facilities Services should complete the form "Request for Lead-Based Paint Inspection", when requesting a survey for Lead-based Paint (LBP).

A copy of the completed assessment reports shall be sent to EHS.

Contractors hired to remove LBP from university buildings shall submit a written abatement plan that must be reviewed and approved by the Department of EHS prior to beginning paint removal.

1. The plan should address the following:

a) An overall time table
b) Specifications of abatement methods
c) Containment of lead dust & debris
d) Protection of workers
e) Clean up during and after abatement
f) Waste management and disposal

The Department of Environment, Health & Safety (EHS) must inspect and approve the containment area before abatement work begin, and, may inspect and perform air monitoring during and after the completion (final clearance) of the abatement project.

If an outside IH firm is hired to perform air monitoring, a copy of all monitoring activities must be submitted to the Department of Environment, Health & Safety.

Lead contaminated waste generated during the abatement projects must be disposed of as hazardous waste through the Department of EHS.

E. PREVENTION OF MOISTURE AND MOLD GROWTH PROBLEMS

1. Introduction

As part of the campus priority for sustainable buildings, energy conservation and indoor air quality are critically important. In the past, building designs have facilitated one or the other criteria but rarely have both aspects been achieved simultaneously.

For renovations and new construction projects, during the schematic design phase, the Designer shall evaluate quantitatively the potential for moisture and vapor intrusion within and through the building envelope. The control of indoor relative humidity, surface temperatures, and moisture migration are the primary means of minimizing microbial growth in buildings. Generally, room air and near surface relative humidity levels less than 60% will preclude mold growth. When excess moisture does enter the building, a design which allows rapid moisture/vapor removal is essential for long term mold prevention within the structure. In addition to the potential to degrade indoor air quality, moisture/mold problems present significant impact on building deterioration and lifespan.

While the University is not located in the geographic region defined by ASHRAE as hot-humid climate, it is located in the part of the country where moisture related indoor air quality problems frequently occur in buildings. Thus it is imperative that the design considerations presented in this document and references be considered for all major building projects.

2. Requirements for moisture control

a) Proper Building Pressurization:

The movement of unconditioned moist air into a structure is one of leading problems that causes moisture and mold growth in buildings. To address this issue, buildings should be designed to operate

under net positive pressure with respect to the outdoors. Building layout, mechanical systems (HVAC, exhaust), and air infiltration are the key elements that must be considered in building pressurization.

b) Minimization of Air Infiltration:

Incorporate the use of air barriers and seals to deter infiltration. The design must specify the maximum infiltration rate to which the building will be constructed.

c) Control of Moisture:

i. Reduce the potential for moisture accumulation, including condensation, and provide for the egress of water that may accidentally enter the envelope and have an effective drainage plane within the wall assemblies to drain rain water.
ii. Prevent penetration of both surface water and groundwater, including capillary water movement through materials.

d) Control of Vapor Diffusion:

While the materials ordinarily used in the building envelope may perform as an adequate vapor retarder, certain buildings may require colder-than-normal interior temperatures that may warrant a special vapor retarder. If vapor diffusion material is required, careful consideration must be given to the permeance rating and location of the vapor retarder. The use of materials with very low permeance rating, such as polyethylene, aluminum foil, and vinyl wallpaper should be avoided.

e) Provide Dehumidification:

It is important to properly size the HVAC systems. Over sizing of HVAC systems can result in short-cycling which reduces the sensible heat but not the latent heat which holds the moisture in the space. Also, energy management control systems must be programmed such that HVAC set backs do not result in an increase in building humidity above allowable limits (generally 60%)

HVAC controls shall include humidity sensors as well as temperature and differential CO2 sensors (indoor/outdoor). Variable fan speed controls tied to the humidistats allow for dynamic control of humidity as well as temperature and outside air requirements (CO2). These 3 parameters are most critical for offices, auditoriums, classrooms and residential spaces where exhaust air is not the predominant feature.

In laboratories spaces with large quantities of fresh air supplied continuously for chemical hood makeup. Temperature and humidity controls and research chemicals containment are the greater challenges without the need for special attention to CO2 concentrations.

f) Materials of Construction:

In general, inorganic construction materials do not support mold growth and are the preferred products wherever practicable. In shower rooms and other areas subject to high moisture levels, products such as dens board (Georgia Pacific) have been used successfully. Interior insulation in duct systems must not be used. Also, carpeting and wall gypsum board extending to a concrete slab below grade are discouraged due to moisture and accidental flooding issues.

g) Site Selections, Grading, and Landscaping Issues:

Grading and Landscaping should be designed to shed water away from the foundation. Sprinkler spray patterns must be directed away from the façade and foundation areas.

h) Scheduling Construction to Minimize Moisture/Mold:

Specifications should be written to require that building materials subject to mold growth are kept dry throughout construction including sheetrock, thermal insulation, wood products, carpets, ceiling tiles etc. Any wetted materials must be replaced at the contractor's expense.

HVAC duct systems must be protected from the collection of dust and debris within the ducts during construction. However, once the dusty operations are concluded, operating the HVAC to remove trapped humidity within the building would be advantageous assuming that the windows and doors are kept closed.

i) Special Considerations for Historic and Old Buildings:

An engineering assessment is required to determine the projected impacts of renovation activities on moisture control within the structure. This assessment should include considerations of below grade, at grade and above grade differences, the tightness of the envelope and the deterioration of or lack of moisture and vapor barriers and retarders.

j) Commissioning:

The building envelope including the roof and windows and wall structures should be tested for water leakage by using pressure hoses on the outside and inspectors on the inside of the building.

The final building structure should be tested for air leaks by pressurizing the building and measuring the leakage rate. The observed air leakage shall not exceed the design infiltration rate used in sizing the HVAC and humidity control systems.

3. Suggested References for Guidance on Design Considerations

a) Preventing Indoor Air Quality Problems in Educational Facilities:

Guidelines for Hot Humid Climates, CH2M HILL and Disney Development Company, Prepared by J. David Odom and George DuBose, Orlando, Florida, 1997

b) Mold, Moisture, & Indoor Air Quality:

A Guide for Designers, Builders, and Building Owners, Joseph W. Lstiburek, Building Science Corporations, Westford, MA. 1994

c) Hold the Line:

Controlling Unwanted Moisture in Historic Buildings, Preservation Brief, National Park Service, Sharon C. Park, AIA, www.cr.nps.gov/hps/tps/briefs/brief39.htm October 1996

d) ASTM:

Moisture Control in Buildings, H. Trechsel, Ed. American Society for Testing and Materials, Philadelphia, PA 1994

e) Ventilation for Acceptable Indoor Air Quality:

ASHRAE Standard 62-2001. American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Atlanta, GA 2001

f) Control of Moisture Problems Affecting Biological Indoor Air Quality,

TFI—1996, International Society of Indoor Air Quality and Climate, Ottawa, Ontario, Canada, 1996

g) ASHRAE:

Humidity Control Design Guide for Commercial and Institutional Buildings, Harriman, Brundrett & Kittler, Atlanta, GA 2002

h) ACGIH:

Bioaerosols: Assessment and Control: Editor: Janet Macher, American Conference of Governmental Industrial Hygienists, Cincinnati, OH 1999.

F. HAZARDOUS AND UNIVERSAL WASTE ISSUES

All Hazardous and Universal Waste (H/U) issues shall be presented to the UNC Environment, Health and Safety Department (EHS).

Contacts are:
Mike Long 919-962-5723
Steve Parker 919-962-5509
EHS Dept. 919-962-5507

All H/U waste shall be handled using applicable Federal and State laws, including EPA regulations codified in the 40 CFR. For assistance, contact EHS.

Contact EHS for a list of University approved disposal vendors, or visit our website at www.ehs.unc.edu for more information.

EHS requires a written plan to be submitted for approval at the beginning of the project that outlines which H/U wastes have been identified and the proposed disposal venues to be utilized.

Bills of Lading, Manifests and LDR'S must be signed by a representative of EHS for all shipments of hazardous or universal waste, excluding asbestos.

If you are unsure if you have a hazardous waste, contact EHS.

1. Bulbs

The following procedure is to be used for 4 and 8-foot fluorescent bulbs, High Intensity Discharge Bulbs (mercury bulbs), and U-Tubes.

a) Bulbs should be placed in manufactured boxes.
b) When you put the first bulb in the box, a Universal Waste label shall be placed on the outside of the box. Fill in contents and date.
c) When not actively putting bulbs in the box, the lid shall be closed and sealed.
d) Keep box inside, and away from any water.
e) EHS does not approve of the use of a fluorescent bulb crusher.

2. *Mercury Contaminated Materials*

a) All mercury contamination must be treated as hazardous waste and disposed of according to State and Federal regulations. All sink traps located within research buildings are suspected to be contaminated with some mercury. Immediately contact the UNC Environment, Health and Safety Department if and/or when these items are discovered for a copy of the University's Mercury Plumbing Removal procedure.
b) Contractor shall contact a reputable hazardous waste disposal firm for removal, shipping, and disposal needs. Mercury items shall be sent to a facility within the U.S. for retort. This includes mercury containing switches, devices, and sink traps.

3. *Ballasts: PCB and Non-PCB Ballast*

a) PCB Ballasts shall be placed into UN approved 55-gallon drums for disposal, and shipped on a Hazardous Waste Manifest. Also, the lid on the drum shall be secured unless actively adding to the drum. There is a one-year time limit to dispose of the drum from when the first ballast went into it. A ballast is considered to be a PCB ballast if the label says it is, or the label does not say at all.
b) Non-PCB Ballasts will have "Non-PCB Ballasts" written on the ballasts. These should be placed in a separate drum, (UN Approved), for recycling. For larger quantities, use a 20y3, covered roll-off that you can send to the recycler.
c) When planning storage, keep in mind that a full ballast drum weighs approx. 700 pounds.

4. *Broken Fluorescent Tubes*

Fluorescent bulbs, HID's, or U-tubes that are unintentionally broken, shall be placed into a UN approved poly drum. These are considered Hazardous Waste and should be treated as such due to the possible release of mercury vapors. When not actively adding to the drum, the lid shall be on, and secure. Also, the drum needs to have a label that says Broken Fluorescent Bulbs, and the date the first item was placed inside the drum. The one-year time limit for disposal applies to this waste as well.

5. *Asbestos*

See the construction specifications on Asbestos Abatement.

6. *Lead Paint*

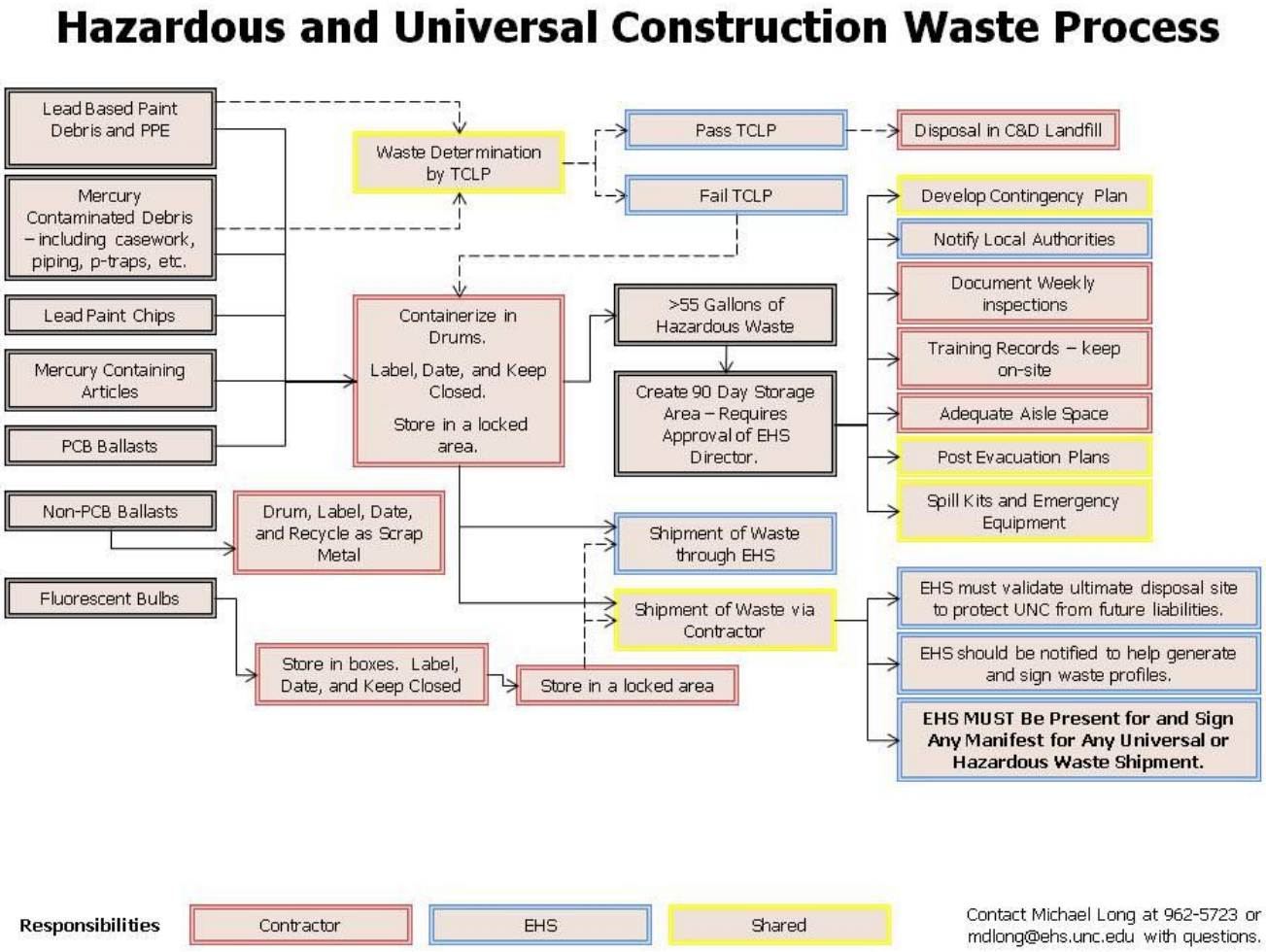
a) Lead Paint waste from scraping, grinding, or peeling is considered hazardous waste and shall be stored in a UN approved drum with the lid securely fastened. This drum must be labeled as Lead Paint Chips and locked in an area away from public access.
b) Core samples from suspected Lead Based Paint containing materials such as walls, windows, doors, and door casings shall be taken prior to demolition and sent for TCLP analysis. An EHS representative shall be present for any sampling activities.
c) All sampling results shall be sent to EHS for proper waste disposal determination.

7. *Miscellaneous chemicals*

Any chemicals found during demolition shall be handled as hazardous waste. Examples include: cylinders, bottles, cans with liquid, spill clean-ups etc.

** When in doubt, contact EHS at 919-962-5507 or Mike Long at 919-962-5723.
** Do not ship any Hazardous/Universal Wastes without EHS notification and approval.

8. Hazardous and Universal Waste Process – Chart



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