NC STATE UNIVERSITY

MANAGEMENT OF BUILDING DEMOLITION DEBRIS

Hazardous Waste Management
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SECTION I
INTRODUCTION

The most important regulation governing hazardous waste is the Resource Conservation and Recovery Act (RCRA), whose primary goals are "to protect human health and the environment from the potential hazards of waste disposal, to conserve energy and natural resources, to reduce the amount of waste generated, and to ensure that wastes are managed in an environmentally sound manner." The basic tenet of this regulation is a "cradle-to-grave" tracking system, meaning that hazardous waste generators (users of hazardous materials who generate hazardous waste) must track waste from the moment it enters the site as a hazardous material to the eventual treatment or disposal of that material. This regulation requires hazardous waste generators to bear the responsibility of dealing with hazardous materials in a responsible way. The responsibility for hazardous waste management can go beyond the grave, as the waste generator is responsible (in part) for the actions of waste handlers and treatment and disposal facilities. Thus, if the handler does a poor job and pollutes the environment, the generator can be held responsible for cleanup.

The University cannot "contract away" its responsibilities for management of hazardous or universal waste. Therefore, the University Hazardous Waste Program Manager (HWPM) needs to be involved with the entire waste identification and the decision-making process. The HWPM needs to approve all aspects of managing hazardous or universal waste, including container selection, labeling, and accumulation area management. The HWPM must sign all documents necessary for removal of hazardous or universal waste attributable to the University. Manifests and certificates of disposal/destruction, treatment or recycling are returned to the HWPM.

The demolition process generates a wide variety of solid waste. This document is to provide the procedure for how this waste is managed. The North Carolina State University (NCSU) Construction Project Manager has ultimate responsibility for the implementation of the project, including coordination of waste management requirements. The NCSU Hazardous Waste Program Manager has responsibility for decisions and actions controlling the determination and management of hazardous and universal waste.

CPU	Central Processing Unit
EH&S	Environmental Health and Safety
EPA	Environmental Protection Agency
Hazardous material	An item that is harmful to human health or the environment
Hazardous waste	Solid waste that is flammable, corrosive, reactive, toxic or a listed waste
HVAC	Heating, Ventilation and Air Conditioning
HWPM	Hazardous Waste Program Manager
MCE	Mercury-Containing Equipment
NCSU	North Carolina State University
NCDENR	North Carolina Department of Environment and Natural Resources
DOT	Department of Transportation
RCRA	Resource Conservation and Recovery Act
Solid waste	Unwanted or discarded solid, liquid, semisolid or contained gaseous material, including, but not limited to: demolition debris; material burned or otherwise processed at a resources recovery facility or incinerator; material processed at a recycling facility; and sludges or other residue from a water pollution abatement facility, water supply treatment plant or air pollution control facility
Universal Waste	Hazardous waste accumulated for recycling. Construction and demolition materials fall into three categories: electronics, batteries (not auto), and mercury containing equipment (fluorescent lamps, discharge lamps, mercury vapor lamps, neon lights, and mercury thermostats and switches). This waste must be recycled within a given timeframe, or managed as hazardous waste.
WMP	Waste Management Plan

A) The NCSU Hazardous Waste Program Manager will approve the Hazardous Waste Management Plan prior to beginning demolition. The contractor may choose to use the Waste Management Plan Form, which includes all the requirements listed in part B below.

B) Waste management plans (WMP) will vary depending on the scale and scope of the project. However, all plans shall include the following:

1. Contractor's emergency contact information.
2. Discussion of expected wastes: Identify the general types of wastes expected for each phase of the project (see Section IV of this document). All environmental testing must be coordinated with the North Carolina State University Hazardous Waste Program Manager (NCSU HWPM).
3. The collection and accumulation strategy: All plans must indicate the location (for example a room number should be listed) of waste storage awaiting pickup. All hazardous wastes must be stored in an appropriate Department of Transportation (DOT) shipping container. The project can obtain containers or NCSU Environmental Health and Safety (EH&S) can deliver them to the site upon request. Indicate container type in the WMP for approval.
4. Marking and identification requirements: All containers must at least be marked with the word "Waste" followed by a description of the contents and the date materials are first added (e.g., Waste Mercury Debris 9/29/08).
5. Procedures for appropriate removal of wastes from the site: Contact NCSU EH&S as soon as a container is properly contained, labeled, and ready for removal. As soon as each container is filled it must be sealed, labeled and scheduled for pick-up. Several pick-up dates may be necessary for long-term projects. If materials are being sent to an outside recycling/reclamation facility include facility information in your HWMP.
6. Decontamination of university owned structures and equipment: Include a general description of materials proposed for decontaminated purposes in your HWMP. These materials will be collected and disposed through the University Hazardous Waste Program. Wastes shall not be discharged to storm drains. Potentially hazardous wastes shall not be discharged to any drains, nor placed in trash receptacles.
7. The project WMP will delineate specific project responsibilities.

C) Waste management issues were outlined in the request for bids and forms the basis for waste management plans that are required for the project. The contractor is most knowledgeable regarding the sequence of events, the scale and scope of the project, and materials likely to be necessary for project completion. For projects that do not involve removal of any regulated substances, a general site safety and health plan may be

sufficient provided it identifies hazard zones, safe work practices, location of safety equipment, access controls, etc. The HWMP will be approved/disapproved at the discretion of the HWPM.

The inspection and evaluation of building components for the purpose of worker protection is described in the referenced Construction Guidelines.

Construction Guidelines, 01300 Contractor Safety Requirements
Construction Guidelines, Section 02 Existing Conditions

SECTION IV
IDENTIFICATION OF HAZARDOUS/UNIVERSAL WASTE

Regulated and hazardous/universal wastes that may be generated during the demolition of university buildings include, but are not limited to, the following general categories:

Asbestos

The survey contractor will refer to the University-provided asbestos inventory, and supplement as necessary, as a basis for surveying the renovated area for the presence of asbestos-containing materials. The survey contractor must recognize the limitations of the University-provided asbestos survey data. Any asbestos-containing building debris can be managed as construction and demolition debris provided necessary procedures are implemented. See Construction Guidelines 01300 and Section 02 Existing Conditions. Asbestos removal and abatement are managed directly by the project contractor and NCSU project Construction Manager.

Decontamination/Cleaning Liquids

The NCSU Hazardous Waste Program Manager will make a determination as to the waste management approach of materials used for decontamination of university-owned structures and equipment depending on the quantity and type. Wastes shall not be discharged to storm drains. Potentially hazardous wastes shall not be discharged to any drains, nor placed in trash receptacles. Once these liquids are properly contained and labeled, contact NCSU EH&S for picked-up and disposal by the University's hazardous waste contractor.

Lead-Based Paint

The hazardous waste program uses the lead paint survey data to determine the appropriate waste management approach for general building demolition debris. The identification of lead integrated into the building components is discussed in Construction Guideline 01300.

Paint chips will be collected in the correct DOT-compliant shipping container and sampled for lead content by the NCSU Hazardous Waste Program Manager. The results of that analysis will determine the waste management approach for this waste type. Lead paint chips in 55 gallon containers or less will be collected for proper disposal by NCSU EH&S. Once these materials are properly contained and labeled, contact EH&S for disposal by the University's hazardous waste contractor.

Lead metal, as a constituent of the metal waste debris being recycled as scrap metal, does not require disposal through EH&S.

Fluorescent and Other Mercury-Containing Lamps

Carefully remove lamps in order to minimize breakage, thereby minimizing potential exposure to mercury vapor. Store lamps in drums or well-taped boxes out of the weather. NCSU has boxes available if needed. Reuse of lamp boxes in good condition is encouraged when available. Broken lamps must be collected in appropriate wax-lined fiber drums or boxes, or in unlined drums, and labeled as "Hazardous Waste—Broken Lamps". Once lamps are properly packaged and labeled, contact EH&S for pick-up and recycling by the University's hazardous waste contractor.

Light Ballasts

Fluorescent light ballasts that do not display a "No PCBs" label, or have a manufacture date before 1980, will be assumed to contain PCBs at a level that causes them to be managed as a PCB-containing article. These PCB-containing articles will be placed in appropriate DOT containers marked with the date the first ballast was removed from the fixture. Once ballasts are properly contained and labeled, contact EH&S for pick-up and disposal by the University's hazardous waste contractor. Areas where PCB ballasts are accumulated for more than 30 days must be posted.

Electrical Equipment (Excluding computer and peripherals)

Electrical equipment removed from the building may contain fluid (e.g., capacitors, transformers, motors, or switches). All fluid-containing electrical equipment will be inventoried and segregated for evaluation prior to disposal or recycling, as the item dictates. The criteria for making this determination will be coordinated with the NCSU Hazardous Waste Program Manager and the appropriate power distribution or electrical personnel in Facilities Operations, and outlined in the project waste management plan.

Computers and Peripherals

Buildings scheduled for renovation sometimes contain computers and peripheral equipment that were left behind during the process of vacating the building. The removal of all computer-related equipment (e.g., monitors, CPU's and printers) needs to be coordinated with Materials Management or the NCSU Hazardous Waste Program Manager.

Mercury-Containing Equipment (MCE)

Mercury-containing equipment (MCE) includes thermostats, thermometers, switches, relays, gauges, and printed circuit boards. These items sometimes are abandoned within the subject buildings. Once MCE wastes are properly collected and labeled, contact EH&S for pick-up and disposal by the University's hazardous waste contractor.

Batteries

Batteries removed from the building during renovation are to be segregated for evaluation and management as either hazardous or universal waste. Batteries or their containers must be marked with the date taken out of service, and the words "Waste Batteries". Once batteries are properly prepared, contact EH&S for pick-up and disposal by the University's hazardous waste contractor.

Benches, cabinets, floors, walls

Where requested as part of the scope of work, the contractor will use a non-hazardous detergent to triple wash and rinse surfaces. Decontaminated items may be reused or discarded. Disposal of these materials may be handled by the project's contractor and coordinated with NCSU EH&S or the project Construction Manager (NCSU). See the guidelines for "Decontamination/Cleaning Liquids" for management of detergent wastes.

Caulking

Some old caulk contains PCB's. Before disposing of pre 1980's building materials sealed with caulk, the caulk must be removed and collected for disposal through EH&S. PCB testing will be performed by EH&S after caulk is removed.

Ducts

Metal air handling ducts removed from the building, associated with either laboratory fume hoods or building HVAC systems, are to be collected by the contractor for recycling as scrap metal.

When visible contamination other than normal dust build-up is observed, the ductwork should be brought to the attention of the NCSU Hazardous Waste Program Manager. Ductwork attached to fume hoods where perchloric acid was used must be handled appropriately (see fume hood section below).

Fume Hoods

NCSU EH&S will inform the NCSU Construction Manager if chemical usage records on hand indicate that perchloric acid was used in the fume hood (fume hoods which have been used with perchloric acid will usually have water wash down features). As applicable, the contractor shall follow appropriate procedures for preventing fire or explosion while decontaminating. Contractors must consider the benefits of utilizing perchlorate screening tests since it is difficult to positively rule out the past use of perchloric acid in hoods without water wash down features. Hoods that will be removed for relocation or salvage must have all accessible wetted surfaces rendered safe for further handling. Disposal or recycling of these materials will be handled by the project's contractor and coordinated with NCSU EH&S and Construction Management.

Metal Piping

Metal piping, including lead, copper and iron, removed from the building will be collected for recycling as scrap metal by the project's contractor.

Hazardous Material Storage Cabinets and Gas Cabinets

Hazardous material storage cabinets must be checked for residues from spills, etc. Residues must be removed, with the removed residue and removal materials being managed as potentially hazardous waste. The NCSU Hazardous Waste Program Manager will make this determination and properly dispose of hazardous wastes if necessary. Contact NCSU EH&S for pick-up as soon as these materials are properly collected and labeled.

Cleaned cabinets can be sent out by the contractor for metals recovery (scrap metal), salvage if it is determined that the cabinets are not suitable for campus reuse.

Refrigeration Equipment

Refrigeration equipment to be removed for the renovation will be evaluated to ensure that each device has been drained of refrigerants. If a piece of equipment is found to contain refrigerants, then the NCSU Construction Project Manager will coordinate the removal of the refrigerants. The refrigeration equipment can be then be managed by the contractor as scrap metal for recycling.

Roofing Materials

PCB concentrations have been found in some roofing materials. The rubberized membrane on Pre 1980's flat roofs will be tested by EH&S to determine proper disposal. This testing must be scheduled well in advance of demolition. The contractor will dispose of large amounts of PCB containing roofing materials (e. g., roll offs) in coordination with the NCSU Hazardous Waste Program Manager.

Sink Trap Sludge

It is assumed that laboratory drain traps could possibly contain mercury. The following procedure describes the collection of sludge from lab sink traps (and other system traps, as necessary) for isolation of mercury.

Laboratory tap water will be run through all wastewater lines and traps prior to removal of traps, breakage of lines or the commencement of demolition activities in the area where these pipes could be disturbed. Prior to disconnection of wastewater system traps, secondary containment, such as a bucket, shall be placed beneath the trap to be removed.

The contractor will disassemble the lab wastewater system beginning with the traps at the lab sinks and potentially elsewhere. Trap contents (sludge) will be removed for visual evaluation. All sludge containing mercury, as well as related piping and debris, will be segregated from the non-mercury contaminated sludge and piping and debris. Both types of sludge and piping and debris associated with piping which contained visible mercury, will be collected in DOT-approved drums (i.e., up to four waste types). The NCSU Hazardous Waste Program Manager will be involved in the initial segregation process and the containers will be picked-up and disposed of by the University's Hazardous Waste Contractor.

Smoke Detectors

Smoke detectors containing a radioactive source must be collected for proper disposal or reuse by NCSU EH&S.

Emergency Exit Signs

Emergency exit signs, which have no electrical connection, may contain a radioactive source and must be collected for proper disposal or reuse by NCSU EH&S.

Oil

Oils must be collected in the appropriate "closed head" DOT container and disposed of through NCSU EH&S. Oils that contain PCB's must be labeled "Waste PCB Oil". Oils that do not contain PCB's or other hazardous materials must be labeled "Used Oil".

Scrap Metals

Scrap metals include metal ducts, piping, metal cabinets, structural and framing metals, and other products. Scrap metals should be set for recycling by the contractor. Some metals that can be recycled include aluminum, copper, brass, lead, galvanized, iron, and steel (stainless and other).

Vacuum Pumps and Lines

Vacuum systems could contain mercury. Use spill prevention methods to avoid spilling mercury when removing vacuum lines.

Other

Residual wastes are materials or contaminants found during the course of demolition and area evaluation. These newly exposed areas were previously inaccessible (e.g., under cabinets), and could contain a variety of articles, chemicals, or contaminants washed or wiped from fume hoods. These residual wastes are to be collected, evaluated, and disposed of in coordination with the NCSU Hazardous Waste Program Manager.

All building demolition debris that is not suitable for recycling/reclamation will be placed in waste containers (e. g., roll offs). The NCSU Hazardous Waste Program Manager will make a determination as to the waste management approach for this waste prior to removal from the work site. EH&S does not generally handle extremely large quantities (roll off boxes) of debris so disposal needs to be included in the project's contract and Waste Management Plan.

Based on the liability provisions of environmental laws, once the University generates a hazardous waste, the University retains permanent liability for the management and appropriate disposal of that waste. In addition, a contractor removing waste may be considered a co-generator as a means of ensuring compliance with the law; NCDENR and EPA routinely perform unannounced inspections at any time. Operations that do not meet regulatory requirements can result in substantial penalties, including fines of up to $32,500 per violation per day. Over the past few years numerous universities and colleges have been fined millions of dollars for violating these hazardous waste requirements

SECTION VI
POINTS OF CONTACT

The University Hazardous Waste Program Manager is Rob Pecarina, 515-6863. E-mail, robert_pecarina@ncsu.edu

The person representing the Hazardous Waste Program on specific projects (at the job-site) is Ellen Buckner, 515-6850. E-mail, ellen_buckner@ncsu.edu