



A-32 – ENVIRONMENTAL DEMOLITION & REMEDIATION

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Applicability

The design specifications for the environmental demolition and remediation are to be used without regard to the anticipated bidding process and contractual agreements for all existing University owned buildings. Certain hazardous materials are found in all construction sites both for renovations and new building construction. It is expected that the contractors and subcontractors are cognizant of these hazards and are taking the necessary measures to protect their employees, University personnel and the environment. Consequently, special attention is not directed to these common materials. These materials include intact lead containing paint, silica in concrete, wood dust, metal fumes (cutting/welding), adhesives, solvents etc.

Building Specific Hazards

While the specifications cover the common hazardous materials in detail, handling of other hazardous materials may need to be added to individual job specifications depending on the prior uses of the building to be renovated or demolished. Many items covered in the specification include the hazards expected in laboratory renovations. References to laboratory specific items should be removed from the specifications for buildings which were never used as laboratory and/or medical facilities. It is important to recognize that the older buildings have served multiple functions and departments through the years and hazards may be hidden in abandoned piping and duct work that have not been used for decades.

Bidding Preference

Preferably, environmental demolition will be bid as a separate project under the control of an environmental demolition contractor who understands and has experience with hazardous materials that are often hidden within a building and do not appear until extensive demolition work is accomplished. All participating environmental demolition contractors must go through a prequalification process conducted by the University or by the General Contractor or CM at Risk.

Work Sequence

The environmental demolition work will precede all subsequent work on a designated project site. All demolition work required to remove all hazardous materials shall be performed by the environmental demolition contractor. If a subsequent contractor will begin work at the site while the environmental demolition contractor is also active at the site, separate work areas must be clearly bounded by rigid walls, ceilings and floors with no opportunity for cross contamination from the environmental demolition work and the other contractors at the site. The minimum area to be devoted to the environmental demolition work is an entire floor of the building at a time.

Once an environmental demolition contractor leaves a defined work-space, the hazmat work is to be complete to the extent of the entire renovation project scope. The intent shall not be for the next contractor to perform further demolition to expose more hazardous material requiring the return of the environmental demolition contractor. Any exceptions to this approach will require further detailed specifications including a clear delineation of tasks and a detailed description of the hazardous material which remains.

Preface

The expectation of the environmental demolition work is to perform all hazardous material removal from each designated, clearly bounded area. The environmental demolition contractor is to control all demolition and hazmat removal according to regulatory requirements in such a manner as to control contract worker exposures below permissible exposure limits and to prevent the release of hazardous materials into adjacent areas or into the environment (soil, air, water and sewer). Any hazardous material that will remain after abatement will be



clearly defined in the specifications and will be secured in a way that subsequent contractors or building occupants will not be exposed to releases of the remaining material. Other than what is clearly excluded, all hazardous material is considered within the abatement scope of this contract.

SECTION 1 – PROJECT INFORMATION

1.01 OVERVIEW

This section shall specify the purpose for the renovation or demolition project. Specific details concerning the project shall include the phasing and scheduling details including start and completion dates. The overview shall outline any phasing required during the project and identify the materials associated with each phase, the location, and the amount of material. The scope of work shall be specific to include any specialty requirements for each area or phase, and any demolition activities required by the abatement contractor. Please Note: The designer shall incorporate all items included in the abatement specification itemized on the bid document on a per square foot basis, per linear footage or items on a per item basis and a cost associated with re-mobilization to the site.

The work schedule shall reflect any anticipated shift work, number of shifts scheduled and the time associated with each shift. The work schedule shall state that the University of North Carolina and/or Project Designer shall approve deviations of the work schedule listed below:

Project Start Date _____ Insert Date _____
Daily Work Schedule _____ AM thru _____ PM
Project Completion Date _____ Insert Date, by 5:00 PM

The University of North Carolina has the right to adjust the schedule and the contractor shall adhere to those revisions provided the total number of days allotted for the project is not altered.

Project Information: The contractor shall post at the job site on a designated display board within 10 square feet of the decontamination unit, the Health Hazard Control Unit (HHCU) notification and all other pertinent licenses. The Point of Contacts for the project shall be posted and include the name, pager number or cell phone number of the following entities:

- The Project Designer
- The Site Superintendent/Supervisor for the Abatement Contractor
- The General Contractor or Site Superintendent
- The Onsite Industrial Hygienist Air Monitor
- The Building Owner Representative
- The Supervising Air Monitor

1.02 BUILDING HISTORY

This section shall include the current function of the building, the location and the age of the building. The history shall include any previous building functions. Incorporate the number of floors, the number of mechanical rooms, a description of the exterior construction, type of roof, windows, and HVAC system. A description of the interior construction shall include the basic flooring, ceiling, walls and plumbing systems. Any previously abated areas shall be identified including the type of material, location and approximate date of



abatement and a description of the replacement material. The description of the replacement materials shall specify if the materials are non-asbestos.

1.03 CODES AND REGULATIONS

The contractor shall assume full responsibility and liability for compliance with applicable federal, state and local regulations pertaining to work practices, waste handling, protection of workers, visitors to the site and persons occupying areas adjacent to the site. Work shall also be completed according to all UNC guidelines including the UNC Design and Construction Guidelines. A copy of these and other UNC guidelines may be downloaded, saved and printed from the UNC Facilities Planning and Construction website. We have directly referenced some of the more pertinent sections of the UNC Design and Construction Guidelines, the UNC Hazardous and Universal Waste Guidelines, the UNC Construction and Demolition Waste Management Guidelines (<http://surface.facilities.unc.edu/OWRRGuidelines/>) and the UNC Waste Reduction Guidelines (<http://www.wastereduction.unc.edu/>) throughout the plan. It is the responsibility of the contractor to read and understand these guidelines and other federal, state and local codes and regulation pertinent to completing the work prior to preparing and submitting the bid package.

Unless modified by this project specification, specifications for work including cutting, remediation, stripping, removal, repair and disposal work shall conform to the updated versions of the following guidelines and standards, as they become available:

The following regulations and guidance published by the Environmental Protection Agency (EPA):

1. Resource Conservation and Recovery Act (RCRA)
2. 40 CFR Parts 260-272, Solid and Hazardous Waste (RCRA)
3. 40 CFR, Part 122 and 125: National Pollutant Discharge Elimination System, Clean Water Act
4. 40 CFR, Parts 260–272: Solid and Hazardous Wastes, (RCRA)
5. 40 CFR, Subchapter J, Parts 300-373: Superfund Emergency Planning and Community Right-to-Know Programs
6. Comprehensive Environmental Response Compensation and Liability Act
7. National Emissions Standards for Hazardous Air Pollutants Asbestos," 40 CFR Part 61, Subpart M
8. "General Provisions," 40 CFR, Part 61, Subpart A
9. "Guidance for Controlling Asbestos-Containing Materials in Buildings" June 1985. (EPA # 560/5-85-024)
10. "Asbestos-Containing Materials in Schools," 40 CFR Part 763, Subpart E including appendices

The following regulations published by the Department of Transportation (DOT):

1. Hazardous Materials Transportation Act as amended
2. 49 CFR Parts 171 through 177

The following regulations published by the U.S. Department of Labor, Occupational Safety and Health Administration (OSHA):

1. "Respiratory Protection," Title 29, Part 1910, Section 134 of the Code of Federal Regulations
2. "Safety and Health Regulations for Construction," Title 29, Part 1926 of the Code of Federal Regulations



3. "Access to Employee Exposure and Medical Records," Title 29, Part 1910, Section 1020 of the Code of Federal Regulations
4. "Hazard Communication," Title 29, Part 1926, Section 59 of the Code of Federal Regulations
5. "Specifications for Accident Prevention Signs and Tags," Title 29, Part 1910, Section 145 of the Code of Federal Regulations
6. "Hazardous Waste Operations and Emergency Response," Title 29, Part 1926, Section 65 of the Code of Federal Regulations
7. "Toxic and Hazardous Substances," Title 29, Part 1926, Subpart Z of the Code of Federal Regulations
8. "Occupational Exposure to Asbestos, Tremolite, Anthophyllite, and Actinolite," Final Rules," Title 29, Part 1910, Section 1001 and Part 1926, Section 1101 of the Code of Federal Regulations
9. "General Safety and Health Provisions," Title 29, Part 1910, Subpart C of the Code of Federal Regulations
10. "Lead," Title 29, Part 1926, Section 62 of the Code of Federal Regulations
11. Federal Standard 313A: Material Safety Data Sheets, Preparation and Submission of

The following regulations published by North Carolina State, county or town agencies:

1. Orange Water and Sewer Use Ordinance, Orange County, North Carolina
2. Orange County Regulated Recyclable Materials Ordinance
3. "North Carolina Occupational Safety and Health Standards for the Construction Industry," 29 CFR Part 1926 as adopted by T13 NCAC 07F .0201 and shipyard T13 NCAC 07F.0500
4. North Carolina General Statutes, including Chapters 95, 97, 130
5. Town of Chapel Hill Noise Ordinance-Ordinance Number 2001-09-24/O-8
6. The State Building Code
7. North Carolina Construction Manual, Division of State Construction, Department of Administration, Section 112.4 Electrical
8. North Carolina Administrative Code, Title 15A, Chapter 13 Solid Waste Management
9. Wastewater Permit discharge requirements for UNC Chapel Hill
10. Occupational Safety and Health Act of North Carolina (OSHANC)
11. North Carolina Asbestos Hazard Management Program Rules as adopted by 10A NCAC 41C .0600.

The following documents published by the American National Standards Institute:

1. "Fundamentals Governing the Design and Operation of Local Exhaust Systems," Z9.2-1979
2. "American National Standard for Respiratory Protection Respiratory Use - Physical Qualifications for Personnel," Z88.6-1984
3. "Practices for Respiratory Protection," Z88.2-1992

Documents published by the following professional electrical engineering, fire or other associations:

1. Underwriters' Laboratories (UL)
2. National Electrical Manufacturers' Association (NEMA)
3. National Fire Protection Association (NFPA)
4. National Electric Code
5. National Electric Safety Code
6. Electrical Testing Laboratory
7. American National Standards Institute (ANSI)



8. Institute of Electrical and Electronic Engineers (IEEE)
9. Requirements for Fire Detection and Alarm Systems/Smoke Detectors Meeting the State on NC Requirements, Department of Insurance, State of North Carolina - Latest Edition
10. ASTM International, "Standard Practice for Visual Inspection of Asbestos Abatement Projects", E 1369-05

The following documents published by UNC:

1. UNC Hazardous and Universal Waste Guidelines
2. UNC Design and Construction Guidelines
3. UNC Construction and Demolition Waste Management Guidelines

Please note where these or other referenced guidelines conflict with this specification or each other, the more stringent of the guidelines shall prevail.

1.04 CONTRACTOR QUALIFICATIONS INCLUDING LICENSES, ACCREDITATIONS AND TRAINING

The contractor shall maintain current company licenses and accreditation, and licenses and accreditations for workers and supervisors as required by applicable federal, state and local jurisdictions for removal of materials and for other regulated activity relative to the work of this contract. The contractor is also responsible for payment of all permit fees required for this project.

- A. The asbestos/hazardous materials abatement contractor will be a licensed general contractor in the specialty interior, building, unclassified or asbestos categories by the North Carolina Licensing Board of General Contractors.
- B. All supervisors shall be accredited by the NC Department of Health and Human Services (NC DHHS)/Division of Public Health/Health Hazards Control Unit (HHCU). All supervisors on the project shall have experience in the administration and supervision of asbestos abatement projects including work practices, protective measures for building and personnel, disposal procedures, etc. Experience and Training: The General Superintendent must be accredited as an Asbestos Abatement Supervisor in accordance with the AHERA regulation 40 CFR Part 763, Subpart E, Appendix C and as amended February 3, 1994 (ASHARA) and be accredited as NCDHHS Supervisors. All supervisors on the project must have had a minimum of Three (3) years on-the-job training in asbestos abatement procedures and have worked at least five (5) projects, three (3) of which are comparable in complexity and size to this project.
- C. All workers performing any asbestos-related shall be accredited by the NC DHHS.
- D. Provide an adequate number of qualified personnel to meet the schedule requirements of the project. Submit to the Owner's Representative a request for approval for any person intended to be employed in the project with said employees' name, social security number, qualifications, "Certificate of Workers' Acknowledgment", and "Affidavit of Medical Surveillance and Respiratory Protection".
- E. A minimum of one supervisor working in the project shall have attended a 24-hour respiratory protection course.



- F. One supervisor shall be provided for every 10 workers inside the containment. A minimum of one supervisor shall be provided per project per work area.
- G. Provide a General Superintendent with experience in administration, environmental remediation, demolition, and of asbestos abatement projects including work practices, protective measures for building and personnel, disposal procedures, etc. This person is responsible for compliance with all applicable federal, state and local regulations, particularly those relating to asbestos-containing materials as outlined in OSHA 29 CFR 1926.1101, and including 1926.20 through 1926.32. The Superintendent needs to be knowledgeable of the North Carolina Asbestos Hazard Management Program Rules as adopted by 10A NCAC 41C .0600. Provide full time Supervisor(s) for inside the work area with experience in asbestos abatement projects including work practices, protective measures for building and personnel, disposal procedures, etc. One of these two supervisors must be able to communicate in the language of the workers and be able to communicate in English to the Building Owner's Representative(s). These persons are responsible for compliance with all applicable federal, state and local regulations, particularly those relating to asbestos-containing materials as outlined in OSHA 29 CFR 1926.1101, and including 1926.20 through 1926.32. The Supervisor(s) need to be knowledgeable of the North Carolina Asbestos Hazard Management Program Rules as adopted by 10A NCAC 41C .0600.
- H. Competent Person: As required by OSHA in 29 CFR 1926.1101 and 29 CFR 1926.20 through 32. This will generally be the General Superintendent if on-site on a full time basis. If the Superintendent is not on-site full time then the Supervisor(s) will be considered the Competent Person and be so trained. Trained supervisor(s) will be required to be inside the work area during all abatement activities.
- I. Submit to the University of North Carolina's Representative a request for approval for any person intended to be employed in the project with said employees' name, social security, qualifications, "Certificate of Workers' Acknowledgment" and "Affidavit of Medical Surveillance and Respiratory Protection". The Building owner's representative and/or IH firm reserves the privilege of approving all General Superintendents and/or Supervisor(s) named for said project. The building owner's representative and/or IH firm also reserves the privilege of requesting that any General Superintendent, Supervisory and/or workers that do not perform in an acceptable professional manner will be asked to leave the worksite either on a temporary or permanent basis.
- J. Medical: Include individually signed and notarized forms by each worker to be utilized on the project documenting that each is actively involved in a company employee medical surveillance program.
- K. Respiratory and other personal protective equipment: Copies of the most recent fit-testing and training records, individually signed for each worker shall be utilized on the project. Demolition personnel must be certified to wear personal protective equipment (PPE), including respiratory protection to complete demolition.
- L. Initial Exposure Assessment: As required by the OSHA construction asbestos standard 29 CFR 1926.1101.
- M. Abatement activities of other environmental hazardous materials will be completed only by contractor personnel that are 40-hour trained as specified in 29 CFR 1910.120 (OSHA Hazardous Waste Operations Training) and who have previous project experience with each contaminant included within the scope of work.



- N. Mercury abatement activities will be completed only by contractor personnel that are 40-hour trained as specified in 29 CFR 1910.120 (OSHA Hazardous Waste Operations Training) and who have previous project experience decontaminating mercury. The contractor's employees shall receive mercury awareness training at the outset of the project that includes the identification of mercury spills, the hazards associated with mercury and its compounds and the proper personal protective equipment to use on the jobsite where mercury has been discovered. The contractor's employees will also be informed that elemental mercury and mercury containing materials, such as organomercuries and inorganic mercuric salts, are inhalation and contact toxins that require special handling and disposal precautions. Mercury compounds are regulated by numerous statutes and regulations, particularly regarding workplace exposure avoidance and prevention of releases to the environment.
- O. Construction activities disturbing lead-containing paint requires adherence to 29 CFR 1926.62 (Lead in Construction Standard). The contractor is responsible for conducting employee airborne exposure monitoring, providing personal protective equipment, and using appropriate exposure control measures as defined by the standard. The contractor's employees shall receive lead awareness, hazard communication, and respiratory training prior to construction work.
- P. Contractor will be responsible for ensuring that General Superintendents, Supervisor(s) and/or non supervisory (worker level) personnel are trained to address other identified environmental concerns in accordance with OSHA and EPA standards.

1.05 NOTICES

The contractor shall notify the following offices in writing within the time frame specified by the National Emission Standard for Hazardous Air Pollutants (NESHAP) regulations prior to beginning any asbestos removal operations.

State Agencies

Health Hazards Control Unit

Occupational & Environmental Epidemiology Section

N.C. DEHNR

(Regular Mail)

P.O. Box 27687

Raleigh, N.C. 27611-7687

Telephone: (919) 733-0820

Fax: (919) 733-8493

(UPS, Fed Ex, etc.)

2728 Capital Blvd

Parker Lincoln Bldg.

Second Floor / 2A210

Raleigh, N.C. 27604

1.06 WORK AREA BOUNDARIES

The contractor will provide and install permanent, six-foot tall, chain link fencing around the building and the staging area prior to completing other work on-site. The chain link fencing will be covered with landscape fabric on one side to reduce noise, dust and visual impact. A lockable access gate to the work and staging area will be installed.



The contractor shall establish work area boundaries that will:

1. Establish a decontamination zone to allow only authorized access to the work areas including personnel decontamination area and staging area.
2. Ensure that unauthorized people do not enter the work area.
3. Protect people in the vicinity of the work area from potential dangers that may exist in the work areas.
4. Ensure contaminants are contained within the work areas.

The contractor should notify the local emergency medical services, police and fire departments in writing of the type and scope of work being performed and request that these departments make an inspection prior to beginning the work.

1.07 STAGING AREA AND PARKING

The contractor is responsible for supplying temporary storage required for storage of equipment and materials for duration of project. As identified in the UNC Planning and Construction Design Guidelines, the contractor's temporary facilities, including trailer and storage dumpsters, will be maintained in the areas designated by UNC Chapel Hill Parking Services in the Department of Public Safety (919.962.7135). Parking will be allowed in areas designated by Mr. Roy Cox.

Universal and hazardous materials and waste may be accumulated and temporarily stored on UNC property, but storage should not exceed 30 days except for extremely hazardous materials, for which arrangements should be made to remove the material from the premises as soon as is practicable. The contractor will provide locked storage for hazardous materials and waste with a clearly marked and labeled section specifically devoted to hazardous waste. Satellite Accumulation Rules should be followed until a total of 55 gallons of waste is accumulated. Once that threshold has been crossed, less than 90 day storage requirements must be implemented. The contractor will clearly identify the storage areas with proper signage and secure the area.

The hazardous and universal waste accumulation area will be pre-approved by UNC and the designer before wastes are stored there. The areas will be open for inspection by the UNC Environment Health and Safety (UNC EHS) or designer upon request. Hazardous waste accumulation area shall be locked when not in use.

The contractor is responsible for keeping the staging area secure. Waste materials will be protected from the weather and stored off the ground. The contractor will complete inspections of the waste storage area on a weekly basis and complete a daily inspection log. The contractor will keep the inspection forms in a project logbook on-site and provide copies to UNC EHS and/or the designer upon request. The contractor shall confirm that containers are secure and not leaking, and wastes are segregated into compatible groups and is properly labeled.

The contractor shall maintain an adequate quantity of spill response supplies to contain, at a minimum, 115% of accumulated waste. If a spill or leak is detected, the contractor shall immediately contact UNC-EHS. The spill or leak should be contained as soon as it is safe to contain. The contractor should clean the spilled material and contain it according to federal, state and local regulations and guidelines. UNC-EHS will assist the contractor in completing the required paperwork, including reporting and regulatory agency notification, as required.

1.08 TEMPORARY FACILITIES



1.08.1 First Aid

A minimum of one first aid kit shall be located in the clean room. Additional first aid kits as the contractor determines as necessary or are required by law shall be located throughout the work area.

1.08.2 Fire Extinguisher

The contractor shall comply with the applicable recommendations of the National Fire Protection Agency (NFPA) Standard 10 - "Standard for Portable Fire Extinguishers." The contractor shall locate fire extinguishers where they are most convenient and effective for their intended purpose, but provide not less than one extinguisher in each work area equipment room and one in the clean room of the personnel decontamination unit.

1.08.3 Toilet Facilities

If required, provide temporary toilet facilities to be used by contractor's employees. Use of the owner's existing toilet facilities will be at owner's discretion and these privileges may be revoked at any time.

1.08.4 Water Services

- A. The contractor shall lock and tag out water equipment in the work area. The contractor shall confirm water supplies have been locked and tagged out prior to beginning work. The owner will provide water for the project. The contractor is responsible for connection to the water source and providing water to the work areas. Contractor bears the expense of getting water to the work and decontamination areas and heating that water.
- B. The contractor shall provide temporary connection to existing building utilities or provide temporary facilities as required herein or as necessary to carry out the work.
- C. The contractor shall employ qualified tradesmen for installation of temporary services and facilities. The contractor shall work with UNC to locate, modify and/or extend temporary services and facilities where they will serve the project adequately and result in minimum interference with the performance of the work.
- D. The contractor shall supply hot and cold water to the decontamination units. Hot water shall be supplied at a minimum temperature of 100 degrees Fahrenheit.
- E. After completion of use, connections and fittings initially installed by the contractor shall be removed by the contractor without damage or alteration to existing water piping and equipment.

Refer to the UNC Design and Construction Guidelines for further information including Chapter V - Technical Design and Performance Standards – Division 15, Mechanical Systems.

1.08.5 Electrical Services

- A. General: The contractor shall comply with applicable National Electrical Manufacturers' Association (NEMA), National Electric Code (NEC), and Underwriter's Laboratory, Inc. (UL) standards and governing state and local regulations for materials and layout of temporary electrical service.



- B. The contractor shall lock and tag out electrical and Heating, Ventilation, and Air Conditioning (HVAC) equipment in the work area. The contractor shall verify that the power and HVAC have been locked and tagged out prior to beginning work. The owner will provide electricity for the project. The contractor is responsible for connection of power panels and providing temporary electrical services to the work areas.
- C. The contractor shall provide temporary facilities as required herein or as necessary to carry out the work. The contractor shall contact UNC Electric Systems for the location of the temporary service equipment, the appropriate size of any CT cabinets (if required), and associated costs for the service. Temporary service is generally provided just inside the construction site fence at an agreed point of delivery as approved by UNC Electric Systems.
- D. Standard temporary service is typically overhead but may be installed underground depending on the construction site. UNC Electric Systems' preferred temporary service is single-phase 120/240 volt furnished from an overhead transformer. Overhead or underground three-phase 120/208 volt, 120/240 volt and 480 volt services can be made available. UNC discourages the use of single-phase 120/240 volt service due to the associated cost.
- E. Temporary services of 200 amperes and under are metered with self contained meters and require a standard meter base supplied by UNC Electric Systems. Temporary services over 200 amperes require current transformers for metering and require a CT cabinet supplied by the contractor.
- F. The contractor is responsible for coordinating and acquiring all local inspections and filing an application for services with the Energy Services Business Office. The filing date must allow adequate time for UNC Electric Systems to provide the desired service.
- G. The contractor shall provide a structure sufficient in strength and height to accept the appropriate overhead or underground supply conductors and to comply with appropriate local and NEC codes for height, voltage, clearance and utilization of power.
- H. The contractor shall employ qualified tradesmen for installation of temporary services and facilities. The contractor shall locate, modify and extend temporary services and facilities where they will serve the project adequately and result in minimum interference with the performance of the work.
- I. Ground Fault Protection: The contractor shall provide receptacle outlets equipped with ground fault circuit interrupters (GFCI), reset button and pilot light, for plug-in connection of power tools and equipment. All GFCIs shall be located outside the containment area. All powered equipment shall be connected to a GFCI.
- J. The contractor shall provide a weatherproof, grounded temporary electric power service and distribution system of sufficient size, capacity and power characteristics to accommodate performance of work during the construction period.
- K. The contractor shall install temporary lighting adequate to provide sufficient illumination for safe work and traffic conditions in every area of work. The contractor will not be allowed to utilize the existing lighting at the site during abatement of asbestos containing materials. All light fixtures shall be cleaned and removed



under the containment or wrapped with two layers of six mil polyethylene sheeting. Maintain a level of at least 75 foot candles in all construction areas. During the final visual inspection, the temporary lighting shall be maintained at level of at least 150 candle foot. Any deviations in the lighting requirements must be approved by UNC EHS and/or the Project Designer. If adequate lighting is not provided during the work process, during visual inspection by UNC EHS, project designer or IH firm, in and/or during air monitoring, the project will be shut down at the contractor's expense until lighting is provided. There will be no additional time allotted to the contractor for the project in the event these circumstances arise. Reference OSHA 29 CFR 1926.56(b).

- L. The contractor shall provide services of an electrician, on a standby basis, to service electrical needs during the abatement process.
- M. The contractor shall provide additional power service and distribution service, consisting of individual, dedicated 15 amp 120 volt circuits to electrical drops with receptacle outlets equipped with ground fault circuit interrupt protection, color coded for the exclusive use of the industrial hygiene firm. A minimum of 5 drops per work area is required.

Refer to the UNC Design and Construction Guidelines for further information including Chapter V - Technical Design and Performance Standards – Division 16, Electrical – Section 16050 – General and Section 16441 – Service and Distribution.

1.08.6 Security

- A. The contractor is responsible for constructing and maintaining secure containment areas including the entry/exit areas. The regulated area shall be restricted to authorized, trained, and protected personnel including the contractor's employees, employees of subcontractors, state representatives and other designated individuals. The contractor shall establish a list of authorized personnel prior to job start and post this list in the clean room of the decontamination facility. Abatement, remediation and demolition locations will be appropriately identified utilizing warning signs as required by OSHA and city, state, and federal regulations. The contractor is responsible for creating and maintaining a secure work area during the entire project.
- B. The contractor is responsible for maintaining secure entry/exit locations at the facility while work is being completed.
- C. The contractor shall maintain a logbook in the clean room area of the decontamination system. Anyone who enters the regulated area must record name, affiliation, time in, and time out for each entry.
- D. Access to the regulated area shall be through a single decontamination system. Other means of access (doors, windows, hallways, etc.) shall be blocked or locked so as to prevent entry to or exit from the regulated area. The only exceptions to this rule are the waste pass-out air lock that shall be sealed except during the removal of containerized waste from the regulated area, and emergency exits in case of fire or accident. Emergency exits shall not be locked from the inside; however, they shall be sealed with polyethylene sheeting and tape.

1.09 LOCKOUT/TAGOUT



The contractor shall have a company lockout/tagout program. A coordination meeting may be required with UNC Facilities where locks are required from both the University and the contractor on the same switch gear. The contractor shall lock and tag out electrical equipment, including HVAC equipment and water in the work areas. The contractor shall verify that power and water in the work areas have been locked and tagged out prior to beginning work. The owner will provide electricity and water for the project. The contractor is responsible for temporary connection to power panels and the temporary water lines and routing electricity and water to the work areas.

1.10 HOT WORK

The contractor is responsible for having a hot work permit program, training the workers and utilizing hot work permits. Written documentation shall be kept for each hot work permit provided on a daily log. Each permit shall be cancelled when work is completed or on a daily basis, whichever time is shorter. Cancelled permits shall be maintained by the contractor. A copy of each initial permit authorization and the cancelled permit shall be kept on-site by the contractor in a binder and provided to UNC and/or the designer upon request.

1.11 RADIOACTIVE, BIOLOGICAL AND CHEMICAL HAZARDS

The occupants may be required by UNC-EHS to remove radioactive, biological and chemical materials and obtain clearance from UNC-EHS prior to vacating their location(s). Documentation of these clearances may be obtained from UNC-EHS. UNC-EHS keeps documentation on a variety of environmental health and safety data including, but not limited to the following:

- A. The Hazardous Materials Management Program maintains UNC's chemical inventory system and hazardous materials use permits. Chemical inventory reports can be generated and sorted by location and chemical-specific parameters such as hazard class, toxicity and physical state. This information may be used by the contractor to evaluate recent potential sources of contamination within a lab.
- B. Hazardous waste generated on campus is processed through the UNC-EHS' Chemical Waste Program. A representative of UNC-EHS must observe waste sampling, review all testing data and waste determinations and must sign all manifests. The waste shall be accepted, transported and disposed by one of the pre-qualified waste disposal contractors listed in Section 1, 1.14 - Hazardous and Universal Waste Disposal. The contractor is responsible for fees associated with transportation and disposal of hazardous and universal waste materials.
- C. The contractor is responsible for certifying, by documentation, items which are decontaminated and disposed are clean and free of hazardous materials. If such decontamination is completed to remove only a certain amount of hazardous materials to a level appropriate for a specific disposal option, this must also be documented by a proper waste determination.
- D. The UNC-EHS also tracks the use of radioactive materials and equipment on campus. A health physicist is assigned to every research project that uses isotopes and assists the researcher in moving materials between locations. The health physicist also coordinates terminal radiation surveys.
- E. The Biosafety Program tracks the use of biohazardous materials and assists the professors with relocation of such materials.



- F. Radioactive materials currently stored in the building will be relocated by UNC-EHS prior to the contractor beginning work. UNC-EHS will complete testing to confirm a radiation hazard does not exist in the known storage locations of radioactive material. The contractor shall utilize a radiation meter during the completion of the work to protect workers from potential radioactive materials that may be discovered during completion of the work. UNC-EHS must be notified immediately of any positive findings.

1.12 BIOLOGICAL HAZARD REMEDIATION

Standard laboratory decontamination methods will be adequate for the majority of the surfaces that may contain biological hazards. The contractor shall utilize NSF International/ANSI 49 methodology for decontamination of areas that may contain biological hazards. Biological waste will be placed into appropriate storage containers immediately following generation of the waste. The container shall be sealed, labeled with appropriate shipping label and stored in appropriate staging location. The contractor is responsible for coordinating biological material disposal with the pre-qualified waste disposal contractors listed in Section 1, 1.14- Hazardous and Universal Waste Disposal.

Decontamination of Potential Biological/Pathogenic Materials (optional)

The contractor will disinfect all biosafety laboratory suites and biosafety cabinets (e.g., biosafety cabinet work surfaces, etc.) wiping them thoroughly with a 10% bleach solution. Arrangements should be made for more rigorous disinfecting procedures for Biosafety Level II and III suites involving paraformaldehyde vapor procedures or other equivalent methods pre-approved by the UNC-EHS Biological Safety Office.

1.13 MERCURY SPILLS AND CONTAMINATION

1.13.1 Related Documents

A mercury survey will be performed by UNC, the results of which will be provided to the contractor and will be the basis for determining which labs and areas require decontamination. This initial survey will indicate areas of greater probability of finding mercury, but all areas must be tested during the removal of plumbing and case work. Although this survey will serve as the initial scoping document for mercury abatement activities, the contractor must be aware that during the performance of the contract, particularly during demolition activities, other areas of mercury contamination may be identified, which will be the responsibility of the contractor to properly decontaminate.

1.13.2 Summary

- A. This section covers the demolition, use, handling, storage, transport, accumulation, and disposal of mercury spills and mercury-contaminated building and laboratory materials. The contractor should be aware that elemental mercury, and its compounds- e.g., organic and inorganic mercuric salts, are inhalation and contact toxins that require special handling and disposal precautions. Mercury compounds are regulated by numerous statutes and regulations, particularly regarding workplace exposure avoidance and prevention of releases to the environment.
- B. The contractor is advised that mercury spills may contaminate asbestos-containing building materials that may be removed by the contractor. The presence of mercury above hazardous waste action levels



on asbestos-containing materials requires that the material be managed as a hazardous waste. The contractor is responsible for properly accumulating, storing, and disposing of mercury-characteristic and other hazardous wastes at an EPA permitted and UNC approved Treatment, Storage, and Disposal Facility (TSDF). The contractor is required to subcontract an approved UNC-Chapel Hill hazardous waste disposal contractor for disposal of hazardous waste generated under this contract. The contractor shall notify UNC and designer when UNC owned hazardous materials, not specifically identified in this contract, are discovered. Methodologies for removal and/or decontamination of the newly identified hazards will be presented to the owner and designer for approval prior to the initiation of mercury abatement activities.

- C. Worker protection: Personal protective equipment for workers should be clearly specified in the site specific health and safety plan for the project. A minimum of Level C protection is recommended. Most of the protective measures detailed in Section 6.00 of the Asbestos Abatement Specification have general application to decontamination of mercury spills and demolition activities in the presence of mercury. Exceptions are the use of respirators fitted with mercury vapor cartridges and chemically impermeable gloves (nitrile or rubber) to prevent mercury compounds from contacting the skin.
- D. Removal of mercury-containing intrinsic items: Manufactured or intrinsic items containing elemental mercury will be identified by the inspector and reconfirmed and removed by the contractor. Examples of intrinsic items containing mercury include: manometers and pressure gauges (e.g., Stokes McCleod gages), thermometers (laboratory and duct insertion), pumps, switches (e.g., MERCROID switches, etc.), thermostats, and fluorescent tubes (see Section 13.0A). The contractor will segregate these items from other mercury-containing waste and manage them as hazardous and/or universal after they are removed. The contractor will arrange to have intrinsic items shipped to a recycler for recovery of mercury by retort. All shipping paperwork must be signed by an UNC-EHS representative.
- E. UNC “Controlled Materials” are defined as any material that poses a human health threat or damage to the environment. Disposal options should be thoroughly investigated for these materials and may involve recycling or reuse or disposal. Irresponsible discharges to the environment or improperly managing waste should be avoided. It is imperative that the use, handling, storage, transportation, and disposal of hazardous and recyclable materials and waste from UNC facilities and the UNC campus are consistently managed following the guidelines outlined in federal, state, local, and UNC regulations. This ensures the safety of UNC personnel and visitors and averts liability or penalties to UNC from the reckless or improper disposal or management of waste generated during the performance of the contract or during transport off campus.
- F. The contractor shall have a mercury spill kit, mercury vacuum or other appropriate equipment on-site in the immediate location of work activities. The contractor shall clean visible mercury discovered or accidentally spilled while completing work. If mercury is detected visually or with mercury vapor detection equipment, the contractor shall immediately notify UNC-EHS and initiate cleanup activities.

1.13.3 Mercury action levels and regulatory exposure limits

- A. Air Survey Action Level (ASAL): 250 ng/m^3 (0.000250 mg/m^3) - the concentration of mercury in the initial air survey above which action must be initiated to both identify the source and to remove or decontaminate it. Areas below the ASAL during the initial survey must also be tested during the removal of plumbing and case work. The ASAL is established at 1/100 the TLV (defined below) to provide a substantial margin of protection for building occupants and workers and to ensure that all sources of



mercury are discovered. Please note that the ASAL is 4 times less than the concentration of mercury vapor allowed after decontamination is attempted to offset the limited ability to detect less volatile mercury compounds (i.e., inorganic mercuric salts) that may be present at concentrations also requiring decontamination. The contractor should include methodologies for removing these inorganic compounds in proposed decontamination procedures.

- B. OSHA Permissible Exposure Limit (PEL) for mercury: 100,000 ng/m³ (0.1 mg/m³) - Maximum allowed worker exposure over an 8-hour time weighted average.
- C. NIOSH 8-Hour Time Weighted Average (TWA): 50,000 ng/m³ (0.05 mg/m³) - Maximum recommended worker exposure over an 8-hour period.
- D. OSHA Permissible Exposure Limit for Methylmercury- 10,000 ng/m³ (0.01 mg/m³) - Maximum allowed worker exposure to this toxic organomercury over a 8-hour TWA. Methymercury is the metabolic product of mercury and is typically accumulated in bacterial sludge in wet sink traps.
- E. Threshold Limit Value (TLV): 25,000 ng/m³ (0.025 mg/m³) - Established by the American Conference of Governmental Industrial Hygienists (ACGIH) this is the time-weighted average concentration of mercury in the air for a normal 8-hour work day and 40-hour work week. Workers may repeatedly be exposed to this concentration without experiencing adverse health effects.
- F. Agency for Toxic Substances & Disease Registry (ATSDR) Indoor Air Quality: 1,000 ng/m³ [0.001 mg/m³]- This is the recently established maximum concentration for residential indoor air quality published by an agency of the Center for Disease Control and Prevention (CDC).
- G. Post Decontamination Air Clearance Level (PDCL): 1,000 ng/m³ (0.001 mg/m³) - This is the concentration of mercury vapor at the surface of a item or area, which has been decontaminated, below which the item or surface requires no further decontamination and, therefore may be disposed as a non-regulated solid waste for recycling or reuse.
- H. Toxicity Characteristic Leaching Procedure (TCLP): 0.2 mg/L- Mercury concentration in a TCLP extract (EPA Method SW 1311) of a solid waste equal to or above which the material must be managed as a mercury-characteristic hazardous waste.
- I. Total Mercury Concentration Clearance Level: 4.0 mg/kg [4 ppm]- the total concentration of mercury in a digest of a solid waste equal to or above which the material must be managed as a hazardous waste. The level was established to afford an estimate of the TCLP extraction efficiency and is 20 times the TCLP action level. Typically this test is run in lieu of TCLP, when limited sample is available.
- J. North Carolina Wastewater Discharge Limit: 0.0002 µg/L - The concentration of mercury in wastewater below which it may be safely and compliantly discharged to the sewer. Wastewater with concentrations equal to or greater than 0.0002 µg/L will be disposed of as hazardous. It may not be discharged to storm drains, the municipal sewer, sanitary drains in the building, or dumpsters, nor may it be poured on the ground or directly released to the environment in an uncontrolled fashion. Demonstrated decontamination procedures have not generated significant quantities of hazardous wastewater, however, if large quantities are produced, the contractor will investigate wastewater treatment options to remove or extract specific contaminants preventing it from being discharged to the sewer.
- K. Reportable Spill Quantity- EPA's reportable spill quantity for mercury is approximately 33.6 milliliters (approximately 2-3 tablespoons of liquid). Any quantity equal to or greater than this must be reported to the EPA and state authorities as an uncontrolled release of mercury to the environment. Reporting of any spill to the EPA and state authorities must be coordinated through UNC-EHS. Notify UNC-EHS as



soon as possible after a spill has occurred. Reported releases subsequently require formal planning procedures or remedial site investigation and formal clean-up activities, which includes removal, remediation, and/or disposal of contaminated material, i.e. soil, etc.

1.14 HAZARDOUS AND UNIVERSAL WASTE DISPOSAL

UNC defines hazardous and universal wastes as any waste material that poses a human health threat or may cause damage to the environment. Disposal options should be thoroughly investigated for these materials and may involve recycling, reuse, or disposal. Irresponsible discharges to the environment or improperly managing waste should be avoided. It is imperative that the use, handling, storage, transportation and disposal of hazardous and recyclable materials and waste from UNC facilities and the UNC campus are consistently managed following the guidelines outlined in federal, state, local and UNC regulations and other hazardous waste regulations. Items contaminated with Hazardous material must be decontaminated and sampled to confirm the hazardous materials were removed or shall be disposed of as hazardous waste. All hazardous and universal waste disposal must be cleared through UNC-EHS. Contacts include Mike Long, Safety Officer – 919.962.5723 and Steve Parker, Hazardous Material Manager – 919.962.5509. Containers used to store hazardous waste must be approved by the United States Department of Transportation (DOT). The contractor shall supply necessary containers. The containers shall remain closed except when material is being placed into them. Each container shall be labeled with a properly completed hazardous waste label as soon as any quantity of waste is placed into it. UNC-EHS must observe waste sampling, review all testing data, evaluate waste determinations and must sign all manifests.

- A. The contractor will comply with all regulations and conditions of UNC permits and licenses applicable to the project. Included are wastewater discharge permits and satellite accumulation requirements for hazardous waste, etc.
- B. The contractor assumes responsibility and liability for compliance with all applicable regulations especially those affecting the health and safety of contractor employees, subcontractors, and all others at UNC during the performance of the work. This responsibility includes the protection of UNC employees and visitors located near the worksite. Prevention of damage to UNC property, supplies, and equipment from accidents, improper storage or misuse of hazardous materials shall also be avoided.
- C. Hazardous materials and waste may be accumulated and temporarily stored on UNC property per the provision of UNC's hazardous waste permit, but should not exceed 30 days, except for extremely hazardous materials, for which arrangements should be made to remove the material for the premises as soon as is practicable. The following conditions should be met to ensure that hazardous substances are properly managed:
 1. Hazardous waste containers should be in good condition, compatible with the material being stored in it, properly labeled at all times, and free of leaks.
 2. Adequate secondary containment should be provided for those wastes where accidental discharges or leaks could cause an environmental release.
 3. Hazardous waste accumulation areas will be pre-approved by the owner and designer before wastes are stored there. The areas will be open for inspection by the owner or designer upon request. Hazardous waste accumulation areas shall also be inspected at least daily by the contractor or its environmental oversight subcontractor and shall be locked when not in use.



Wastes in containers that are leaking will be immediately transferred to a reliable container and any spilled material properly cleaned up.

The contractor should coordinate waste disposals with one or more of the UNC approved vendors listed below (as listed on the UNC website). The contractor is responsible for the disposal fees of hazardous and universal waste disposal.

Do not ship any Hazardous or Universal Wastes without EHS notification and approval. EHS must be notified to ensure that the proper paperwork, with the correct EPA ID number, addresses, and emergency contact information is used. An EHS representative MUST sign all paperwork for recycling or disposal shipments Universal or Hazardous Waste, including Bulbs.

Approved Waste Vendors as of 4/01/10:

Clean Harbors
208 Watlington Industrial Drive
Reidsville, NC 27320
336-361-3110
Clinton Atkinson
3910-280-8108
Atkinson.clinton@cleanharbors.com

Ecoflo
2750 Patterson Street
Greensboro, NC 27407
336-855-7925
Fernando Cruz
336-587-4634
fcruz@ecoflo.com

EEl
4650 Spring Grove Avenue
Cincinnati, OH 45232
800-850-3587
513-853-3587

Heritage
4132 Pompano Road
Charlotte, NC 28216
704-564-9802

PSC
1201 Exchange Street
Charlotte, NC 28208
704-399-1744



Matt Gemmell
804-836-2706
MKGemmell@pscnow.com

Tradebe/PCI
1004 Idlewild Boulevard
Columbia, SC 29201
Mary Place
803-800-8587
mplace@pollutioncontrol.com

Alternatives:

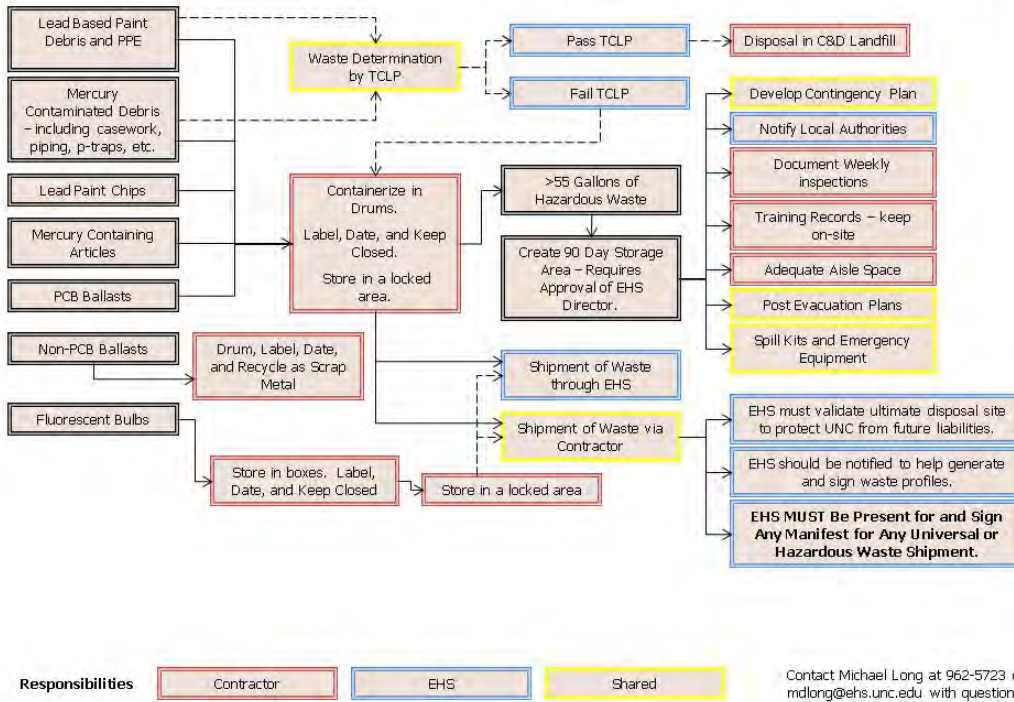
Lee Iron and Metal Co., Inc
P.O. Box 778
2219 S. Horner Blvd.
Sanford, N.C. 27331
919-775-7951
(For metal scrap, brass, Non-PCB Ballasts, lead)

NSB- Battery recycler
437 Ward Blvd
Wilson, N.C. 27893
252-237-3938
1-800-682-6896
Contact- Nancy

Veolia
Creedmoor, NC
919-528-3996



Hazardous and Universal Construction Waste Process



Refer to the UNC Design and Construction Guidelines for further information including Chapter IV – Supplemental Guidelines – Section B-Hazardous Material Guidelines – Sub-Section 6 – Hazardous and Universal Waste Issues. Also refer to American Institute of Architects (AIA) Specifications included in Section III – AIA Specifications - Section 01733 – Demolition and Construction for additional information.

1.15 RECYCLING OF NON-HAZARDOUS DEMOLITION DEBRIS

The contractor should segregate and recycle demolition debris to the extent possible. The contractor is responsible for coordinating recycling and waste disposal. The contractor should discuss and understand the segregation requirements, the maximum acceptable material size and types/sizes of transport containers with the solid waste disposal contractors. Materials to be recycled include, but are not limited to metal pipes, ductwork, fume hoods and sinks. The contractor is responsible for coordinating construction and demolition debris disposal.

The contractor is required to submit a Draft Solid Waste Management Plan fourteen days prior to beginning work activities. The draft should be submitted simultaneously to the designer and the UNC Office of Waste Reduction and Recycling (OWRR) in order to expedite plan review. Once OWRR has communicated requested changes, the contractor has five business days to submit a Final Solid Waste Management Plan (SWMP) (UNC Specification 01505). Any deviance from the final SWMP must be approved by OWRR. In accordance with Specification 01505, each month the contractor must submit documentation (weight tickets, manifests, etc.) of the disposal, recycling, re-use, and salvage of all materials and a summary with each Payment Application. Failure to do so may delay payment. See UNC Design and Construction Guidelines for additional information concerning recycling of non-hazardous materials.



1.16 PROJECT TESTING SUMMARY REPORTS

The contractor shall maintain a log that details the testing performed during the completion of this project including pH, perchlorates, peroxides/oxidizers, acids, metals, salts and other substances. A report shall be completed for each test location and, at a minimum, each report shall include the following information:

1. Cover Sheet entitled "Project Testing Summary Report," stating the project name, contractor project number and UNC project number
2. Date
3. Test Completed
4. Location of Test Including Room Name and Number
5. Test Results
6. Date Samples Sent to Laboratory (if applicable)
7. Date Sample Results Were Received From Laboratory (if applicable)
8. Copy of the Laboratory Results (if applicable)

The contractor shall provide 3 typewritten copies of each report to UNC-EHS and the designer within one week of the test date.

1.17 CONTRACTOR CERTIFICATION OF CLEAN AND QUALITY CONTROL

The contractor shall complete the required work and certify that each area is clean and free of hazardous materials based on applicable federal, state and local regulations. Work areas and other areas should be clean and free of debris, dirt and dust following remediation activities. The contractor will not be responsible for collecting final clearance samples. A UNC representative will collect samples in certain locations to document the condition of the areas sampled. The contractor's environmental health and safety manager shall keep a written log of areas where work was completed, the type of work, the dates work were completed in the area, the quantity of materials removed from the area and any laboratory testing completed. This information should be updated daily, kept in a binder onsite and provided to UNC-EHS and/or the designer upon request. For additional information refer to the AIA Specifications included in Section III – AIA Specifications - Section 01450 – Quality Control. Quality control documentation forms are included in this section.

At the conclusion of each phase of environmental demolition, the following individuals will walk the site together to review the completed work and check for deficiencies:

- Architect
- Environmental Abatement designer
- Environmental demolition contractor
- Construction manager
- EHS representative
- General contractor/CM responsible for subsequent renovation work

The architect and the environmental abatement designer will attest in writing that all hazardous material has been abated or secured according to the specifications and no remaining hazardous material will be disturbed in this space by subsequent construction activity in this space.



If all hazmat has not been addressed, the architect will prepare a punch list of deficiencies to be corrected at the contractor's expense. While fixing the punch list items, the contractor is expected to use the required protective measures necessary to complete the work as outlined by the abatement designer.

If the construction manager or the EHS representative disagrees with the clearance assessment of the architect and consultant, additional testing may be required. If this testing reveals residual contamination, the cost of this testing and additional testing shall be born by the architect and the consultant. Additional abatement expense shall be absorbed by the environmental demolition contractor.

The next phase of construction can begin in the designated work space after all parties agree on the clearance and the architect and consultant sign a document to release the space.

1.18 ENVIRONMENTAL HEALTH AND SAFETY MANAGER

The contractor shall retain the fulltime services of a firm with a Certified Industrial Hygienist or a similarly qualified expert (this person may be employed by the contractor as long as they have the required expertise) having experience managing hazardous substances and a background in chemical toxicology and/or mercury abatement techniques. This person will serve as the project Environmental Health and Safety Manager (EHSM). The EHSM will ensure compliance with all OSHA and EPA regulations. Duties of the EHSM shall include but are not limited to:

- A. Monitoring the contractor's work involving the identification and decontamination of mercury for compliance with the federal, state and local regulations and the provisions of this specification. Included shall be the oversight of activities for properly characterizing, handling, storing, and transporting wastes.
- B. Monitoring air quality of the worksite and contiguous occupied spaces of the building for hazardous vapors, fire and explosion hazards, fumes, dust, aerosols, and odors, etc. The EHSM will assist in the identification and resolution of complaints from contractors, UNC employees and visitors regarding same.
- C. Provide the Construction Manager and his technical authorities with documentation of monitoring and test results impacting the progress of the work and the quality of the workplace environment, as well as test results intended for hazardous waste characterization.
- D. The EHSM will be physically present for the following activities/phases of the project related to mercury (similar specifications may be required for other hazardous materials besides mercury and asbestos):
 1. Air Monitoring during mercury abatement procedures including surface decontamination and sanitary pipe removal described below.
 2. Mercury testing and surveying to delineate the extent of previously identified mercury spills during the initial survey and/or newly discovered mercury spills that are uncovered during the demolition and removal of laboratory casework, etc. Testing must be performed during the dismantling and removal of laboratory plumbing and casework off of floor at all times.



3. Characterization of mercury-containing hazardous wastes using the project surface vapor concentrations outlined in Section 1.12 – Mercury Safety, specifically those in that exceed the PDCL.
4. Mercury exposure monitoring involving the evaluation of the breathing zone air during all decontamination and demolition activities.
5. Air-monitoring and sampling during all other work activities, i.e. nuisance dust sampling, fume hood sampling, etc.

SECTION 2 – CONTRACTOR SUBMITTALS

2.01 REQUIRED CONTRACTOR PRE-SELECTION SUBMITTALS

The contractor shall submit to UNC a written plan describing the means and methods and the materials that will be utilized to complete the project. This submittal shall be used by UNC to select the contractor to complete the work. The following information is required in the submittal:

- A. Written procedures for completing testing for perchlorates, peroxides/oxidizers, acids, metals, salts and other substances that may impact the fume hoods and exhaust systems.
- B. Written procedures for completing testing for chemical and biological contaminants that may be contained in the sanitary sewer piping.
- C. Written procedures for cleaning the fume hoods, fume hood cabinets, fume hood exhaust piping/duct work including exhaust fans and sewer piping including procedures utilizing absorbents, neutralizing agents, solvents and solutions.
- D. Written procedures for decontaminating, dismantling, cutting and moving, to staging area, the fume hoods, fume hood cabinets, fume hood exhaust piping/duct work including exhaust fans, sink drain traps, sewer piping, chemical cabinets and case work.
- E. Written procedures for cleaning and decontaminating floor drains.
- F. Written procedure describing work practices and environmental controls that will be instituted to ensure that mercury and its vapors are properly identified, monitored, contained and deactivated.
- G. A written procedure for roof penetration repair.
- H. A written fluorescent lamp removal and disposal plan.
- I. A written Lockout/Tagout Plan.
- J. A list of subcontractors the contractor will utilize to complete this project.

2.02 REQUIRED CONTRACTOR PRE-AWARD SUBMITTALS



The apparent low bidder shall submit the following items to the Project Designer within twenty-four hours after the bid opening. **Failure to submit the following documentation within the specified timeframe will render the Contractor non-responsive.**

- A. Contractor shall include with the package a list of projects similar in size and scope to the work of this project that has been successfully completed by Contractor. Representative jobs thus cited shall span a period of not less than five years preceding commencement of this project. Include names and telephone numbers of references for verification of completion and quality of work.
- B. Contractor shall include with the package a listing of all closed and/or pending citations issued by regulatory agencies and/or judgments against the Bidder from a court of law in North Carolina and South Carolina and within the last three (3) years. If no citations and/or judgments have been issued then a letter to this effect shall be submitted. Serious violations issued from regulatory agency may render the Contractor disqualified.
- C. Contractor shall include with the package a listing of all assessed or pending penalties or liquidated damages, and the project in which it occurred within the last three (3) years. If no assessed penalties or liquidated damages have been incurred or is pending within the past three (3) years than a letter to this effect shall be submitted. Assessed or pending penalties or liquidated damages may render the Contractor disqualified.
- D. Contractor shall include with Bid a listing of any contract terminations or pending termination by the building owner or contractor within the last three (3) years. If no such contract terminations have occurred than a letter to this effect shall be submitted.
- E. Contractor shall include a work schedule for the project that includes the number of workers that will be scheduled for the project, work days and hours expected to be scheduled.
- F. Contractor must submit a list of all subcontractors that will be utilized during the project. The Contractor should plan on this list being a constant, unless prior notification has been given to the contract administrator and building owner representative. UNC has the right to deny the change of subcontractor.
- G. Contractor must submit a list with an explanation for any legal technical problems or pending problems that have yet to be settled that has occurred on completed or current projects over the past three (3) years. If no such legal problem is occurring or pending than a letter to this effect shall be submitted.

2.03 REQUIRED CONTRACTOR PRE-JOB SUBMITTALS

2.03.1 General

The contractor shall submit three complete, bound sets of pre-job submittals to UNC and one copy to EHS at least fourteen work days prior to start of work. Work is prohibited until the submittal package has been reviewed and approved by UNC. UNC does not assume any responsibility or liability for errors and omissions in the contractor's submittals. A copy of the submittals shall be kept in a three-ring binder (project log) by the contractor at the project site.



- A. Draft Solid Waste Management Plan (to be reviewed by designer and UNC). Written procedures for minimization of waste outlining the methodologies that will be instituted to ensure that maximum quantities of waste generated are recycled, recovered, or reused, as well as methodologies for minimizing hazardous wastes generated from contaminated construction/demolition debris.
- B. Final Solid Waste Management Plan – (Revised to include comments from designer and UNC). The final plan must be received 5 business days prior to beginning work.
- C. A written site-specific Hazardous Waste Management Plan and Health and Safety Plan.
- D. Notifications: Provide notification letters to local EMS, fire and police departments and any other required notifications.
- E. Employee List: Provide copies of lists of supervisors and workers, along with their accreditation and Social Security numbers, to be utilized on the project.
- F. Permits: Provide copies of required permits.
- G. Medical: Include individually signed and notarized forms by each worker to be utilized on the project documenting that each is actively involved in a company employee medical surveillance program.
- H. Respirator Training: Copies of most recent fit testing records, individually signed for each worker to be utilized on the project.
- I. Additional Training (Lead): As required by the OSHA Lead in Construction Standard 29 CFR 1926.62, provide documentation of employee training on the Hazard Communication Standard 29 CFR 1926.59 and Lead in Construction Standard 29 CFR 1926.62.
- J. Initial Exposure Assessment (Lead): As required by the OSHA Lead in Construction Standard 1926.62, provide documentation of all monitoring and other data used in conducting employee exposure assessments relevant to the project.
- K. Project Schedule: Time schedule for the project, outlining the proposed start, setup, clearances, etc. for the various phases of the project. List holidays expected to work in advance. The contractor will be required to pay for any additional holidays worked due to slippage in schedule.
- L. Contingency Plan: The contractor shall prepare a site-specific contingency plan for emergencies including fire, accident, power failure, negative pressure system failure, supplied air system failure (if applicable), evacuation of persons for both life threatening and non-life threatening injuries, or any other event that may require modification or abridgment of decontamination or work area isolation procedures. Include in plan specific procedures for decontamination or work area isolation. Note that nothing in this specification should impede safe exiting or providing of adequate medical attention in the event of an emergency.
- M. Any other programs or training as outlined by the OSHA and EPA standards.

2.03.2 Asbestos Abatement



Submit three complete, bound sets of pre-job submittals to the designer and one copy to EHS, in an expedited manner, at least fourteen work days prior to start of work. Work is prohibited until submittal package has been reviewed and approved by designer. A copy of the approved submittals shall be kept in a three-ring binder (project log) by the contractor at the project site in the clean room or in the on-site office of the contractor.

- A. Notifications: Provide copies of Asbestos Permit Application and Notification for Demolition/Renovation (NC DHHS Form), which provide written notice to all required agencies, including North Carolina HHCU. Provide notification letters to local EMS, fire, and police departments.
- B. Employee List: Provide copies of lists of supervisors and workers, along with their accreditation and Social Security numbers, to be utilized on the project.
- C. Permits: Provide copies of approval of a waste disposal site in compliance with 40 CFR 61.154. Identification of both asbestos and hazardous waste landfills is required.
- D. Medical: Include individually signed and notarized forms by each worker to be utilized on the project documenting that each is actively involved in a company employee medical surveillance program.
- E. Respirator Training: Copies of most recent fit-testing records, individually signed for each worker to be utilized on the project.
- F. Initial Exposure Assessment: As required by the OSHA construction asbestos standard 29 CFR 1926.1101.
- G. Any other programs or training as outlined by the OSHA and EPA standards.

2.03.3 Mercury Abatement

Submit three complete, bound sets of pre-job submittals to the designer and one copy to EHS, in an expedited manner, at least fourteen work days prior to start of work.

- 1. Mercury Action Plan describing the procedures, work practices, and environmental controls that will be used to ensure that mercury and its vapors are properly identified, monitored, contained, and deactivated.
- 2. Site Specific Health and Safety Plan delineating the hazards associated with mercury and its compounds that may be encountered during the project; personal protective equipment that will be used by all workers working with mercury; and contain MSDSs of contaminants and commercial reagents that the contractor will use and store onsite for performance of the contract.
- 3. Waste Minimization Plan outlining the methodologies used to ensure that maximum quantities of waste generated are recycled, recovered, or reused, as well as methodologies for minimizing hazardous wastes generated from contaminated construction/demolition debris.
- 4. The Mercury Action Plan should include provisions for waste test results to be formally documented and submitted to the owner as they are received from an EPA accredited testing or analytical laboratory. Appropriate QC samples will be collected and/or run by the laboratory. The contractor will fully evaluate the implications of the results on waste handling, and/or workplace health & safety and report unusual or extremely hazardous findings to the owner immediately.



5. Resumes and qualifications of Project Safety Officers and the EHSM and/or firm.

2.04 REQUIRED CONTRACTOR ACTIVE PROJECT SUBMITTALS AND POST-JOB SUBMITTALS

2.04.1 General

The contractor shall submit three complete, bound sets of post-job submittals to UNC following the final completion of the work.

- A. Monthly documentation (weight tickets, manifests, etc.) of the disposal, recycling, re-use, and salvage of all materials and a summary with each Payment Application. (Coordinate with Waste Disposal contractors.)
- B. Affidavits: Contractor's affidavit of payment of debts and claims, affidavit of release of liens, and consent of the surety company to final payment.
- C. Manifest: UNC-EHS must sign all outgoing hazardous waste manifests and receive copies of the return waste manifests after disposal.
- D. Daily Supervisor Log: A notarized copy of all daily logs showing the following: name, date, entering and leaving time, company or agency represented, reason for entry for persons entering the work area, employee's daily air monitoring data as required by the OSHA standard and written comments by inspectors, UNC, and visitors.
- E. Medical: Copies of worker release forms, asbestos training certification forms and respirator training documentation of all new employees hired during the project.
- F. Project Testing Summary Reports as discussed in Section 1, 1.15 - Project Testing Summary Reports.
- G. Contractor Daily Work Log as discussed in Section 1, 1.16 - Contractor Certification of Clean and Quality Control.
- H. Quality Control Documentation Forms.

2.04.2 Asbestos Abatement Specific Submittals

- A. Post-Job Submittals

Submit three complete, bound sets of post-job submittals to the designer following the final completion of the work.



1. **Manifest:** North Carolina Asbestos Waste Shipment Record (DEHNR 3787) receipt from landfill operator which acknowledges the contractor's delivery(s) of waste material. Include date, quantity of material delivered and signature of authorized representative of landfill. Also, include name of waste transporter.
2. **Daily Log:** A notarized copy of all daily logs showing the following: name, date, entering and leaving time, company or agency represented, reason for entry for all persons entering the work area, employee's daily air monitoring data as required by the OSHA standard and written comments by inspectors, industrial hygienists, designers and visitors.
3. **Medical:** Copies of medical surveillance program forms, worker release forms, asbestos training certification forms and respirator training documentation of all new employees hired during the project.
4. **Special Reports:** All documents generated under Section 1.06.
5. **Daily manometer readings:** All strip chart recordings or manual documentation (manual readings 3 times per eight hour work shift) shall be included in the post submittal package

B. Special Reports

1. **General:** Except as otherwise indicated, submit special reports to designer within one day of occurrence requiring special report, with copies to others affected by occurrence. Also keep a copy in the project logbook.
2. **Reporting Unusual Events:** When an event of unusual and significant nature occurs at site (examples: failure of negative pressure system, rupture of temporary enclosures), prepare and submit a special report to the designer immediately, listing chain of events, persons participating, response by contractor's personnel, evaluation of results or effects, and similar pertinent information. When such events are known or predictable in advance, advise designer in advance at earliest possible date.
3. **Reporting Accidents:** Prepare and submit reports of significant accidents, at site and anywhere else work is in progress. Record and document date and actions; comply with industry standards for reporting accidents. For this purpose, a significant accident is defined to include events where personal injury is sustained, or property loss of substance is sustained, or where the event posed a significant threat of loss or personal injury.

C. Contingency Plan

Prepare a site-specific contingency plan for emergencies including fire, accident, power failure, negative pressure system failure, supplied air system failure (if applicable), evacuation of injured persons for both life threatening and non-life threatening, or any other event that may require modification or abridgment of decontamination or work area isolation procedures. Include in plan specific procedures for decontamination or work area isolation.



Note that nothing in this specification should impede safe exiting or providing of adequate medical attention in the event of an emergency. Keep these plans in the on-site office.

Post outside/in clean room of Personnel Decontamination Unit:

1. Telephone numbers and locations of emergency services including but not limited to, fire, ambulance, doctor, hospital, police, power company, telephone company, and the North Carolina HHCU.
2. A copy of Material Safety Data Sheets (MSDS) for any chemicals used during the asbestos project.

The contractor shall post asbestos signs in each appropriate language as per the OSHA 29 CFR 1926.1101 standard.

2.04.3 Mercury Abatement Specific Submittals

Post-job Submittals:

Submit three complete, bound sets of post-job submittals to the designer following the final completion of the work.

1. Field and Lab Test Results involving air and personal exposure monitoring, should the latter be necessary. This data will be compiled and reported to the owner and its representatives as soon as they are received by the contractor, but also incorporated in the draft and final reports. Air monitoring will be performed not only in the project worksite, but also in areas of the building that are still occupied and being used for administrative and research or instructional purposes.
 - a. Copies of hazardous waste manifests and bills of lading from hazardous or universal waste shipments.
 - b. A Draft and Final Report detailing the areas of contamination, the results of initial air monitoring, procedures used for decontamination and removal of mercury, quantities and types of waste generated, and the results of final clearance air surveys performed to determine the effectiveness of the procedures employed.

Note: Requests for final payment will not be approved until the submittal package has been reviewed and approved by the general contractor.

SECTION 3 – ITEM SPECIFIC ENVIRONMENTAL REMEDIATION

3.01 FLUORESCENT TUBE, HIGH INTENSITY DISCHARGE BULBS AND U-TUBE REMOVAL AND DISPOSAL

Many fluorescent tubes, high intensity discharge bulbs and U-Tubes contain the element mercury, a material regulated by federal, state and local environmental laws. Thus, the contractor shall remove the fluorescent tubes, high intensity discharge bulbs and U-Tubes and they shall be handled as regulated waste. The contractor shall complete the removal of fluorescent tubes, high intensity discharge bulbs and U-Tubes prior to completing other work identified in this section of the plan (Section 3 – Scope of Work).



The contractor shall remove and handle fluorescent tubes, high intensity discharge bulbs and U-Tubes in a manner which will minimize occurrences of lamp breakage. The use of a device for the crushing and disposal of fluorescent light bulbs is prohibited. Unbroken bulbs are much easier and safer to manage than broken bulbs. The lamps shall be placed in the manufacturers' box or other suitable containers (sturdy cardboard box with cushioning material) appropriate for shipment to the recycling facility. When not actively putting bulbs into the box, the contractor shall close and seal the box. Boxes shall be stored in a dry location and shall remain dry. A Universal Waste label shall be placed on each box as soon as one bulb is placed into the box. If a bulb does break it shall be handled as hazardous waste and the materials should be properly contained in a UN polyethylene drum and disposed of properly, and in a timely manner. The container must be capped with a lid that ensures no material will be spilled from the container during storage or transport and labeled appropriately, including a class 8 corrosive sticker.

The contractor is responsible for coordinating fluorescent lamp disposal with the pre-qualified waste disposal contractors listed in Section 1, 1.14 - Hazardous and Universal Waste Disposal. An EHS representative is required by law to sign any paperwork associated with bulbs shipments.

Refer to Section 1, 1.13 – Mercury Spills and Contamination for additional information. Also refer to the UNC Design and Construction Guidelines for further information including Chapter IV – Supplemental Guidelines – Section B – Hazardous Material Guidelines – Sub-Section 6 – Hazardous and Universal Waste Issues.

3.02 PCB AND NON-PCB BALLASTS

The contractor shall safely remove ballasts and observe the written information on the ballast. Ballasts that contain PCBs shall be placed into a UN approved 55-gallon drum for disposal and shall be shipped on a Hazardous Waste Manifest. The lid on the drum shall be secured unless the contractor is actively placing ballasts into the drum. A Class 9 label should be placed on the drum as soon as the first ballast is placed into it. The contractor will consider a ballast as containing PCBs if the written information of the ballast indicates it contains PCBs or does not clearly indicate it does not contain PCBs.

Non-PCB ballasts will have "No PCB's" written on them. The contractor shall place non-PCB ballasts in a different UN-approved 55-gallon drum. Only non-PCB ballasts shall be placed in the drum. The lid on the drum shall be secured unless the contractor is actively placing ballasts into the drum. The drum should be labeled as soon as the first ballast is added.

The contractor shall coordinate disposal of the materials with the appropriate pre-qualified waste disposal contractor listed in Section 1, 1.14 - Hazardous and Universal Waste Disposal. An EHS representative is required by law to sign any paperwork associated with bulbs shipments.

Refer to the UNC Design and Construction Guidelines for further information including Chapter IV – Supplemental Guidelines – Section B – Hazardous Material Guidelines – Sub-Section 6 – Hazardous and Universal Waste Issues.

3.03 CHEMICAL STORAGE CABINETS, CASEWORK AND SURFACES



3.03.1 Chemical Storage Cabinets

The contractor shall thoroughly clean the interior of each chemical storage cabinet and accessible exterior portions of the chemical storage cabinet before moving the cabinet. Next, the contractor will carefully move the cabinet to access the exterior portions of the cabinet that may have been inaccessible where it was originally situated (i.e., the back of the cabinet, the side of the cabinet, the top of the cabinet and/or the bottom of the cabinet). The contractor will use extreme care when moving the cabinet and be aware of potential hazards associated with moving the cabinet. Such hazards include asbestos exposure from dislodging asbestos-containing floor tile from the floor or baseboards applied to walls with asbestos-containing mastics/adhesives that have bonded to the cabinet over the years of use, biological hazards and chemical hazards including chemicals that may have leaked in the cabinet and are present under the cabinet. The contractor should be prepared to discover chemicals under the cabinet from chemical leaks which may have previously occurred within the cabinet. The contractor shall minimize impact and shock when moving the cabinet. The contractor shall thoroughly clean the inside and outside of the cabinet.

Decontamination of the cabinets should be completed in a controlled area. The contractor shall implement a decontamination plan to address multiple compounds. Absorbents, buffering compounds, neutralizing agents and/or solvents or other items may be used at the contractor's discretion for the decontamination procedure along with atomizers, sprayers, washers and wipes. Decontamination fluids will be contained in 1H1 55-gallon drums and decontamination solids will be contained in 1A2 55-gallon drums. The contractor will complete appropriate testing on the cabinet to confirm decontamination procedures were successful and the cabinet does not contain hazardous materials. The cabinet will be decontaminated until test results confirm hazardous materials are not contained on the cabinet.

3.03.2 Casework and Surfaces

The contractor shall thoroughly clean casework and surfaces. The contractor will use extreme care when moving casework and other items and be aware of potential hazards associated with moving the casework or other items. Such hazards include asbestos exposure from dislodging asbestos-containing materials, biological hazards and chemical hazards including chemicals that may have leaked and are present in unexposed and/or hidden locations. The contractor should be prepared to discover chemicals under these items from chemical leaks which may have previously occurred. The contractor shall minimize impact and shock when moving these items. The contractor shall thoroughly clean and decontaminate casework and other items such as countertops and cabinets which may need to be removed to access sanitary sewer piping locations.

Decontamination of these items should be completed in a controlled area. The contractor shall implement a decontamination plan to address multiple compounds. Absorbents, buffering compounds, neutralizing agents and/or solvents or other items may be used at the contractor's discretion for the decontamination procedure along with atomizers, sprayers, washers and wipes. Decontamination fluids will be contained in 1H1 55-gallon drums and decontamination solids will be contained in 1A2 55-gallon drums. The contractor will complete appropriate testing on these items to confirm decontamination procedures were successful and these items do not contain hazardous materials. These items will be decontaminated until test results confirm hazardous materials are not contained on the items.



The results of chemical testing will be documented by the contractor (refer to Section 1, 1.16 - Project Testing Summary Reports).

The contractor will store the 55-gallon drums in the staging area approved by UNC-EHS and coordinate disposal with the appropriate pre-qualified waste disposal contractor, if the waste fails TCLP, listed in Section 1, 1.14 - Hazardous and Universal Waste Disposal. Please refer to Section 1, 1.10 through 1.17 for further information.

3.04 ASBESTOS ABATEMENT

3.04.1 General

- A. The asbestos/hazardous materials abatement contractor will be a licensed general contractor in the specialty of interior, building, unclassified or asbestos categories by the North Carolina Licensing Board of General Contractors.
- B. The contractor shall be responsible for inspecting the site prior to bidding to confirm the scope of the work. Any quantities listed by the designer in the plans, specifications or survey are done so as approximations. The actual quantities of asbestos-containing materials – hazardous materials to be encountered are the responsibility of the contractor.
- C. The contractor shall furnish and is responsible for all costs including, but not limited to: permit fees, containment preparation, labor, materials, services, insurance, bonding, and equipment necessary to carry out the abatement and hazardous materials operations including disposal of all asbestos and hazardous materials in accordance with the plans and specifications, EPA and OSHA regulations, and any applicable state and local government regulations. Contractor is required to subcontract an approved UNC-Chapel Hill hazardous waste disposal contractor for disposal of hazardous waste generated under this contract.
- D. The contractor/employer has and assumes the responsibility of proceeding in such a manner that he offers his employees a workplace free of recognized hazards causing or likely to cause death or serious injury. The contractor shall be responsible for performing this abatement and disposal so that airborne asbestos fiber levels do not exceed established levels. Workers shall not be exposed to any hazardous substance above the OSHA PEL without appropriate personal protective equipment.
- E. The contractor will be responsible for all costs associated with employee monitoring to meet the OSHA requirements.
- F. The contractor is responsible for all costs, including additional visits, should the designer and/or the industrial hygiene firm determine that the contractor failed a final inspection. Notification and scheduling of the final inspection during the project is the responsibility of the contractor. The contractor will allow a minimum notice of 48 hours unless a different time frame is agreed upon by the designer and the contractor.
- G. UNC will pay for a total of _____ **days** of air monitoring at a rate of _____ per eight-hour shift/per man during a continuous week of **Monday through Friday**. A **weekend rate** of _____ per eight-man hour day on weekends and



_____ during the eight major **holidays**. Overtime will be surcharged at a fee of _____ per hour for more than eight (8) hours per day or more than forty (40) hours per week. This price includes sample analysis for up to ten **(10) samples per day** by Phase Contrast Microscopy (PCM). Contractor will be responsible for the cost of utilizing the Owner's IH for weekend, holiday work, overtime hours and/or holidays, unless permission has been received from the Building Owner and/or the Project Designer. The Building Owner will not be responsible for more than the _____-Days of designated air monitoring

3.04.2 Personnel

- A. A competent person, as defined in the OSHA asbestos standard 29 CFR 1926.1101, employed by the contractor must be outside the work area at all times to monitor activity, ensure containment security, provide information to visitors, and provide access to the work area.
- B. The contractor is responsible for the behavior of workers within his employment. If at any time during the contracted work, any of his employees are judged to exhibit behavior unfitting for the area or judged to be a nuisance by the owner or designer, the contractor shall remove them immediately from the project. The contractor shall be responsible for compliance with the following concerning employee behavior:
 - 1. Under no circumstances are firearms, alcohol, drugs or any other type of controlled substances permitted on university property.
 - 2. All workers are restricted to the construction project site only.
 - 3. All vehicles must be parked in areas prearranged with the owner.
 - 4. All workers must conform to the following basic dress code when in public areas of the project confines: long pants, shirts, no tank tops, no shorts, no bare backs.
 - 5. The contractor is responsible for disposal of all trash brought on state property by his employees, including drink cans, bottles or other food containers and wrappers.
 - 6. The Industrial Hygiene Firm, retained by UNC, shall maintain the same air monitor throughout the project. Any deviations in the onsite air monitor must be approved by EHS. If an alternate air monitor is approved during the project, the Project Designer will conduct a site visit and review the specification, the schedule and other pertinent information with the alternate air monitor.

3.04.3 Site Investigation

- A. By submitting a bid, the Contractor acknowledges that he/she has investigated and satisfied himself/herself as to:
 - 1. The conditions affecting the work, including, but not limited to, physical conditions of the site which may bear upon site access, handling and storage of tools and materials, access to water, electric or other utilities or otherwise affect performance of required activities;



2. The character and quantity of all surfaces and subsurface materials or obstacles to be encountered in so far as this information is reasonably ascertainable from an inspection of the site, exploratory work done by the Owner or designated consultants, and information presented in specification included with this contract;
 3. The environmental condition, including the presence, location, and condition of asbestos-containing materials and other hazardous materials at the site.
- B. Any failure by the Contractor to acquaint himself/herself with available information will not relieve him/her from the responsibility for estimating properly the difficulty or cost of successfully performing the work. The Owner is not responsible for any conclusions or interpretations made by the Contractor on the basis of the information made available by the Owner.
- C. Under no circumstances shall the Contractor rely on the material quantities indicated in this document as the total basis for the proposal price. All quantities indicated herein are approximate and intended to alert the Contractor to the general scope of the project. Scheduled quantities refer only to asbestos-containing materials (ACM) the contractor may expect to encounter. No increase in contract cost will be considered due to the Contractor's failure to physically verify all quantities of the ACM specified by this document for removal.
- D. The Contractor shall include in their proposal price the total estimated square footage of ACM anticipated. No proposal will be accepted from the Contractor who has not inspected the job site either in person or through a qualified designated representative.

3.04.4 Air Monitoring – Industrial Hygiene

A. General

1. UNC shall be responsible for the coordination and contracting of an industrial hygiene firm. UNC will pay for services rendered by the industrial hygiene firm.
2. Air monitoring shall be done under the direct supervision of a North Carolina accredited supervising air monitor (SAM), retained by the University, except for sampling performed by the contractor to satisfy OSHA requirements.
3. SAM shall be accredited per the Asbestos Hazard Management Program rules.
4. Air monitor shall be accredited as per the Asbestos Hazard Management Program rules and work under the direct supervision of a SAM.
5. The SAM representing each firm shall have taken a 24-hour respiratory protection course that is either National Institute for Occupational Safety and Health (NIOSH), AIHA (American Industrial Hygienists Association) or HHCU recognized.



6. If specific project activities are assigned to an air monitor, the SAM is expected to be responsible for industrial hygiene work completed on the project.
7. Employees of the HHCU shall have right of entry into the project. The HHCU's SAM shall have final authority over the industrial hygiene firm on the project.
8. The designer, architect, SAM, construction manager and EHS shall be responsible for all final decisions relative to the project including the final visual inspection. The project designer and/or EHS shall conduct all visual inspections with the air monitor. The project designer and EHS shall be provided with a minimum of 24 hours notice prior the visual inspection.
9. The Project Designer will conduct a site visit once per week and review the manometer readings, air monitoring data and perform an inspection within the work area.
10. The SAM will be responsible for all air monitoring data collected during the project and shall sign each field sheet upon review.
11. The industrial hygiene firm shall immediately report any deficiencies in the work of the contractor including failure to comply with all applicable regulations to the project designer and EHS.
12. The industrial hygiene firm shall notify the designer, EHS and the contractor, in writing, of any failed clearance visits.
13. The SAM shall submit a written project monitoring plan to the designer and EHS and a copy will be provided to the onsite air monitor.

B. Scope of Work

1. The industrial hygiene air monitoring firm hired by the University shall offer expertise to the designer and contractor, but is not directly responsible for the performance of the job. The air monitoring firm shall maintain an onsite representative during the abatement of asbestos-containing materials.
2. At the job site, the industrial hygiene air monitoring firm is expected to observe, be aware, and comment on general work site conditions and activities as they relate to the specifications and profession of industrial hygiene, and make recommendations in writing to the designer and contractor.
3. The industrial hygiene air monitoring firm shall furnish the contractor a copy of the filed reports if requested. Copies of field notes and reports of observations shall be kept in project logbook.
4. The industrial hygiene air monitoring firm is to conform to the contractor's schedule and shall respond to necessary changes, provided an advance notice is given as outlined in Section 1.00.
5. The industrial hygiene air monitoring firm's project monitor shall furnish designer and contractor with a pager or mobile phone number where he can be reached quickly at all times.



6. The industrial hygiene air monitoring firm shall notify the designer and contractor immediately via phone and within twenty-four (24) hours, in writing of any failed clearance visits.
7. At the completion of the project, the industrial hygiene firm shall prepare a report describing the assessment of the project, all air monitoring data, acceptance letters, calibration records, and a description of the project as it proceeded to completion and submit four copies of the report to the designer.

C. Air Monitoring

1. Ambient Air Monitoring: The purpose of ambient air monitoring by the industrial hygiene firm will be to detect discrepancies in the work area isolation such as: Elevated counts outside the asbestos control area
2. The air sampling plan shall require the air monitor to collect a minimum of five air samples per 10 hour shift.
3. Contamination of the building outside of the work area with airborne asbestos fibers.
4. Failure of filtration or rupture in the negative pressure system.
5. Confirm the work practices established by the contractor and respiratory protection provided for employees are adequate.
6. Work Area Airborne Fiber Levels: The owner's industrial hygiene firm will monitor airborne fiber levels in the work area. The purpose of this air monitoring will be to detect airborne fiber levels, which may challenge the ability of the work area isolation procedures to protect the balance of the building or outside of the building from contamination by airborne fibers.
7. The Industrial Hygiene Firm shall conduct onsite PCM analysis on a daily basis. Analytical results shall be available for review with 12 hours of collection.
8. Work Area Clearance: To determine if the elevated airborne fiber levels encountered during abatement operations have been reduced to an acceptable level, the industrial hygiene firm will sample and analyze air per Section 10.02.
9. In accordance with AHMB Program Rules, the SAM shall develop an Abatement Project Monitoring Plan that complies with EPA and OSHA analytical criteria and will provide a valid representation of airborne fiber concentrations both inside and outside the work area. This program is not intended to satisfy the contractor's requirement for sampling under the OSHA regulation. All personnel and area sampling conducted by the industrial hygiene firm shall be personally observed. Air sampling pumps shall not be left unattended for extended periods of time.
10. All personal air samples will be collected in such a manner as to comply with OSHA collection and analytical regulations, and to provide a valid representation of airborne fiber levels. The samples collected by the industrial hygiene firm on personnel do not satisfy the contractor's responsibility under OSHA.



11. All final area air sampling will comply with all State and Federal requirements in measuring airborne asbestos following an abatement action.
12. Air samples will be analyzed and results made available as per the AHMB Program Rules.
13. If TWA samples are being collected by the contractor for the purpose of reducing respiratory protection requirements, the industrial hygiene firm shall directly observe the conditions and work practices represented by each sample and make appropriate notes in the bound book on site.
14. Supplemental air monitoring may be conducted inside and outside the work area by the HHCUC. This supplemental sampling does not fulfill air-monitoring responsibilities required by OSHA, EPA, or this contract.
15. If stop work action levels occur, Contractor is responsible for completing corrective work with no change in the Contract Sum or time requirements, if high airborne fiber counts were caused by Contractor's activities. The Contract Sum and schedule will be adjusted for additional work caused by high airborne fiber counts beyond the Contractor's control. If visual inspection is unsatisfactory or Air Clearance Levels are not met, the Contractor must complete corrective work with no change in the Contract sum or time requirements. The period for all work, including final clearance and clean-up of the site following final results, shall be no later than **5:00 PM** on the specified completion date. Contractor shall be responsible for Project Administration and/or Owner's IH costs on an hourly basis should work continue beyond this time if the delay is the result of the Contractor's activities.

3.04.5 Negative Pressure System

A. General

1. Before any work begins on the containment barriers, shutdown and seal off all heating, cooling, ventilating or other air handling systems serving the work area. The environment of the work area shall be completely isolated from all other air flows in the building.
2. High efficiency particulate air (HEPA) filter exhaust systems equipped with new HEPA filters for each project shall be used. Exhaust equipment and systems shall comply with ANSI Z9.2-79 and used according to manufacturer's recommendations.
3. A continuous chart-recorded manometer shall be used to confirm this condition or manual readings three times per eight hour work shift and maintained onsite throughout the duration of the project. On a weekly basis (if applicable): Submit to the IH onsite a printout from pressure differential monitoring equipment. Mark printout twice daily with date, time, and initials. Use printout paper that indicates elapsed time in intervals no greater than hours. Indicate on each day's record, times of starting and stopping remediation/demolition work, type of work in progress, breaks for lunch or other purposes, periods of stop work, and filter changes. Cut printout into segments by day, attach to 8 1/2" by 11" paper. Label with project name, contractors name, and date. These readings shall be included in the Post Submittal Documents.
4. The contractor shall demonstrate operation and testing of pressure differential system to Owner and/or the onsite IH before start of work/isolation by performing smoke test to check for leaks and



breaches as outlined in OSHA CFR 1926.1101 (i)(B)(1). Smoke tests are to be completed at the beginning of each shift. The onsite IH shall document the results of each smoke test on a daily basis.

The contractor shall use reinforced flexible ducting in occupied areas and/or high traffic areas.

5. A system of HEPA-equipped air filtration devices shall be configured so that a pressure differential is established between the work area and the surrounding area (-0.02 to -0.04" water column). A continuous chart-recorded manometer shall be used to confirm this condition.
6. Additional air filtration devices shall be provided inside the work area for emergency standby as well as for circulation of dead air spaces.
7. The pressure differential is maintained at all times after preparation is complete and until the final visual inspection and air tests confirm the area is clean and acceptable for occupancy and the designer confirms verbally with written follow-up to discontinue the use of the negative pressure system.
8. Air shall be exhausted outside the building. Any variations must be approved by the HHCU.
9. The contractor shall check daily for leaks and log his checks in the bound logbook. This includes checks internal to air-moving devices.
10. There shall be a minimum of four air changes per hour in any containment. The following formula shall be used to determine the approximate ventilation requirements for each work area using four air changes per hour (one air change every 15 minutes):

$$\text{Total air flow ft}^3/\text{min} = \frac{\text{Volume of work area (in ft}^3\text{)}}{15 \text{ min.}}$$

$$\text{Number of units needed} = \frac{\text{Total air flow (ft}^3/\text{min)}}{\text{Capacity of unit (ft}^3/\text{min)}} + (1 \text{ Unit for Safety Factor per Containment})$$

11. Prepare a contingency plan (as described in Section 02080.1.06) in the event of power failure and loss of negative pressure within the work area. The contingency plan shall be approved by the designer and owner.

3.04.6 Work Area Preparation

A diagram identifying the locations of the decontamination unit, the equipment waste loadout, the asbestos waste dumpster and the negative air machines will be incorporated within the specification. If the contractor requests to alter the locations of these items, a revised diagram must be prepared by the contractor and submitted to the Project Designer and the Building Owner's Representative for approval. The diagram will also identify locations of water connections and sanitary sewer drains. DISCHARGING INTO THE STORM WATER DRAINS ON UNC'S CAMPUS IS PROHIBITED.

A. General



1. Before work begins in an area, a decontamination unit must be in operation as outlined in Section 8.00. The locations of decontamination units shall be approved by the designer.
2. Completely isolate the work area from other parts of the building so as to prevent contamination beyond the isolated area.
3. Temporary facilities shall be addressed as outlined in Section 3.00.
4. The contractor shall set up a work area, load out, and decontamination area as shown in the plans and specifications. The designer must pre-approve any variations. The decontamination facility outside of the work area shall consist of a change room, shower room and equipment room as described in Section 8.00.
5. The contractor shall wet clean and/or HEPA vacuum all items and equipment in the work area suspected of being contaminated with asbestos, but not in direct contact with the asbestos material and will either secure these items in place with polyethylene sheeting or have them removed from the work area.
6. Critical Barriers: The contractor shall thoroughly seal the work area for the duration of the work by completely sealing off all individual openings and fixtures in the work area, including, but not limited to, heating and ventilation ducts, doorways, corridors, windows, skylights and lighting, with 2 layers (minimum) of 6-mil polyethylene sheeting taped securely in place. If the contractor is using sealant materials to fill in small holes or cracks, the material shall have appropriate fire ratings.
7. Floors (if required): Apply two or more layers of 6-mil (minimum) polyethylene plastic sheeting with joints overlapped 24 inches and taped securely. Plastic shall be carried up walls a minimum of 12 inches and secured.
8. Walls: Apply two or more layers of 6-mil (minimum) polyethylene plastic sheeting with joints lapped 24 inches and taped securely. Plastic shall be lapped over floor coverings and taped securely.
9. Floors and walls shall be installed in such a manner that they may be removed independently of the critical barriers.
10. Entrances and exits from the work area will have triple barriers of polyethylene plastic sheeting so that the work area is always closed off by one barrier when workers enter or exit.
11. No water may be left standing on the floor at the end of the workday.
12. Floor surfaces, walls, finishes or coverings, etc., that in the contractor's opinion will likely be damaged by water or that may become contaminated with asbestos, shall have additional protective preparation as the contractor sees appropriate, at his cost, to protect the original condition of the surfaces.
13. Any costs associated with physical damage caused by water or securing polyethylene sheeting to areas inside or outside the abatement area shall be the contractor's responsibility.



14. The contractor shall establish and mark emergency and fire exits from the work area. Emergency procedures shall have priority over established decontamination entry and exit procedures. Audible and visible fire and emergency evacuation alarms shall be installed so as to be heard and seen throughout the entire work area.
15. Integrity of these seals shall be regularly checked and maintained by the contractor.
16. After work area preparation, the contractor shall notify the designer verbally with written follow-up that he is ready for a pre-work inspection.
17. Allow for viewing ports of plexi-glass for the Building Owner, inspectors and his representatives, measuring 24 inches by 24 inches in an external wall of the contained work area. A viewing port needs to be placed at each end of the containment.

B. Work Area Preparation for Exterior Work

1. Contractor shall isolate each work area with barrier tape and appropriate signage (per 29 CFR 1926.1101) installed at a minimum distance of twenty (20) feet the building.
2. Contractor shall place a 6-mil (minimum) polyethylene drop cloth on ground within the regulated work area. Contractor shall protect trees and shrubs with 6-mil (minimum) polyethylene sheeting. Contractor is responsible for any damage to trees, shrubs, or any other vegetation impacted during this project. Drop clothes shall be secured neatly in-place to avoid trip hazards.
3. Before work begins in an area, a decontamination unit must be in operation as outlined in Section 8.00. The locations of decontamination units shall be approved by the designer.
4. Temporary facilities shall be addressed as outlined in Section 3.00.
5. Contractor shall locate waste dumpster as close as reasonably possible to the regulated area. Owner and designer shall approve location of waste dumpster.
6. After work area preparation, the contractor shall notify the designer verbally with written follow-up that he is ready for a pre-work inspection.

3.04.7 Worker Protection

A. General

1. Provide worker protection as required by OSHA, state and local standards applicable to the work. Contractor is solely responsible for enforcing worker protection requirements at least equal to those specified in this Section.
2. Each time a work area/regulated area is entered the contractor shall require all persons to put on new sets of disposable coveralls, new foot coverings, new head cover, and a clean respirator.



3. Workers shall not eat, drink, smoke, chew gum or chew tobacco in the work area, the equipment room, the load out area, or the clean room.

B. Worker Training

Train all workers in accordance with 29 CFR 1926 and North Carolina state regulations regarding the dangers inherent in handling asbestos, breathing asbestos dust, proper work procedures and personal and area protective measures.

C. Medical Examinations

Provide medical examinations for all workers. Examination shall as a minimum meet OSHA requirements as set forth in 29 CFR 1926.1101 .

D. Protective Clothing

1. Provide disposable full-body coveralls and disposable head covers, and require that they be worn by all workers in the work area. Provide a sufficient number for all required changes, for all workers in the work area.
2. Boots: Provide work boots with non-skid soles and, where required by OSHA, foot protection for all workers.
3. Gloves: Provide work gloves to all workers and require that they be worn at the appropriate times. Do not remove gloves from work area. Dispose of work gloves as asbestos-contaminated waste at the completion of the project.
4. Eyewear: Provide OSHA approved protective eyewear for all workers and require they be worn at the appropriate times.

E. Additional Protective Equipment

Half-face negative pressure respirators with combination HEPA and chemical cartridges, disposable coveralls, head covers, and footwear covers shall be provided by the contractor for the owner, the designer, Industrial hygiene firm and other authorized representatives who may inspect the job site.

3.04.8 Personal Decontamination

- A. Require that all workers use the following decontamination procedure as a minimum requirement whenever leaving the work area:
 1. Remove disposable coveralls, disposable head covers, and disposable footwear covers or boots in the equipment room.



2. Still wearing respirators, proceed to showers. Showering is mandatory. Care must be taken to follow reasonable procedures in removing the respirator to avoid asbestos fibers while showering. The following procedure is required as a minimum:
 - a. Thoroughly wet body including hair and face.
 - b. With respirator still in place thoroughly wash body, hair, respirator face piece, and all exterior parts of the respirator.
 - c. Take a deep breath, hold it and/or exhale slowly, completely wet hair, face and respirator. While still holding breath, remove respirator and hold it away from face before starting to breathe.
 - d. Carefully wash face piece of respirator inside and out.
 - e. Shower completely with soap and water; rinse thoroughly.
 - f. Rinse shower room walls and floor prior to exit.
 - g. Proceed from shower to changing (clean) room and change into street clothes or new disposable work items.
3. After showering, each employee shall inspect, clean and repair his respirator as needed. The respirator shall be dried, placed in a suitable storage bag and properly stored.

3.04.9 Respiratory Protection

A. Description of Work

Instruct and train each worker involved in asbestos abatement in proper respirator use and require that each worker always wear a respirator, properly fitted on the face, in the work area from the start of any operation which may cause airborne asbestos fibers until the work area is completely decontaminated. Use respiratory protection appropriate for the fiber level encountered in the workplace or as required for other toxic or oxygen-deficient situations encountered.

B. General

1. Provide workers with personally issued and marked respiratory equipment approved by NIOSH and MSHA and suitable for the asbestos exposure level in the work areas according to OSHA Standard 29 CFR 1926.1101 and other possible contaminants employees might be exposed to during the project.
2. Provide respiratory protection from the time the first operation involved in the project requires contact with asbestos-containing materials (including construction of decontamination units, construction of airtight barriers/barricades, and placing of plastic sheeting on walls) until acceptance of final air clearance test results by the industrial hygiene firm.



3. The minimum respiratory protection for the project during gross removal operations in interior containments shall be powered air purifying respirators (PAPR) with appropriate filter cartridges. The minimum respiratory protection for the project during gross removal operations for exterior work areas shall be half-faced negative pressure respirators with appropriate filter cartridges.
4. Respirator fit testing shall be performed as a minimum within the last six months or at the beginning of the project, at any change in respiratory protection equipment, and at any time during the project if requested by the employee or SAM. Fit testing is to be performed by one of the methods listed in the 29 CFR 1926.1101, Appendix C.
5. Do not allow the use of single-use, disposable or quarter-face respirators for any purpose.
6. The contractor may submit a new exposure assessment (as per 29 CFR 1926.1101) to the designer with a request to downgrade to less protective respirators. The designer will issue a decision in writing to the contractor approving or denying his request. If the contractor disagrees with the decision, then the representative air sampling data may be reviewed by the HHCU for a final decision.

3.04.10 Decontamination Units

A. General

1. If the building is occupied, the contractor shall construct the decontamination unit to include a locking mechanism on the entrance door to prevent unauthorized entry. The Air Monitor and a Building Representative shall be issued a key to access the area.
2. Prior to beginning of interior or exterior abatement operations a fully operational decontamination unit must be established. The locations of decontamination units shall be approved by the designer.
3. Provide fully functional personnel decontamination unit attached to the containment.
 - a. Provide a Personnel Decontamination Unit consisting of a serial arrangement of connected rooms or spaces, changing room, shower room, equipment room. Each shall be separated by a minimum of three curtain doorways.
 - b. Provide temporary lighting within decontamination units as necessary to reach an adequate lighting level as required in Section 1.08.5.K.
 - c. Maintain floor of changing room dry and clean at all times. Do not allow the overflow water from the shower to escape the shower room.
 - d. Damp wipe all surfaces twice after each shift change with a disinfectant solution.
 - e. Provide hot and cold water, drainage and standard fixtures including an elevated shower head as necessary for a complete and operable shower. A water hose and bucket is not an acceptable shower.



- f. Arrange water shut off and drain pump operation controls so that a single individual can shower without assistance from either inside or outside of the work area.
- g. Pump shower wastewater to drain. Provide 20 micron and 5 micron waste water filters in line to drain. Change filters daily or more often if necessary. Filtered wastewater shall be discharged into a sanitary sewer only.
- h. Visual Barrier: Where the decontamination area is immediately adjacent to and within view of occupied areas, provide a visual barrier of opaque plastic sheeting so that worker privacy is maintained and work procedures are not visible to building occupants.

B. Equipment Decontamination Units

Provide fully functional equipment decontamination unit attached to the containment.

1. Provide an equipment decontamination unit consisting of a serial arrangement of rooms, clean room, holding area, and washroom, each room separated by a minimum of three curtain doorways, for removal of equipment and material from work area. Do not allow personnel to enter or exit work area through equipment decontamination unit.
2. Washroom: Provide washroom for cleaning of bagged or drummed asbestos-containing waste materials passed from the work area.
3. Holding Area: Provide holding area as a drop location for sealed drums and bagged asbestos-containing materials passed from the washroom.
4. Clean Room: Provide clean room to isolate the holding area from the building exterior or occupied areas.
5. Equipment or Material: Obtain all equipment or material from the work area through the equipment decontamination unit according to the following procedure:
 - a. When passing contaminated equipment, sealed plastic bags, drums or containers into the washroom, close all doorways of the equipment decontamination unit, other than the doorway between the work area and the washroom. Keep all outside personnel clear of the equipment decontamination unit.
 - b. Once inside the washroom, wet-clean the bags and/or equipment.
 - c. When cleaning is complete, insert bagged material into a clean bag/drum during the pass between the washroom and holding area. Close all doorways except the doorway between the washroom and holding area.
 - d. Workers from the building exterior enter the clean room then the holding area to remove decontaminated equipment and/or containers for disposal. Require these workers to wear full protective clothing and respiratory protection as described in Sections 6.00 and 7.00.



C. Decontamination Unit Air Quality Requirements

If the air quality in the decontamination unit exceeds 0.01 fibers per cc analyzed by PCM or 70 structures per mm square analyzed by TEM or its integrity is diminished through use as determined by the designer or industrial hygiene firm, no employee shall use the unit until corrective steps are taken and approved by the designer and industrial hygiene firm.

3.04.11 Asbestos Removal

A. General

1. Prior to starting asbestos removal, the contractor's equipment, work area and decontamination units will be inspected and approved by the designer.
2. All loose asbestos material removed in the work area shall be adequately wet, bagged, sealed and labeled properly before personnel breaks or end of shift.
3. All plastic sheeting, tape, cleaning material, clothing and all other disposable material or items used in the work area shall be packed into sealable plastic bags (6 mil minimum) and treated as contaminated material.
4. All material shall be double-bagged.
5. All excess water (except shower water) shall be combined with removed material or other absorptive material and properly disposed of as per EPA regulations. Contractor shall not place water in storm drains, onto lawns, or into ditches, creeks, streams, rivers or oceans.

B. Scope of Work

1. The scope of work for this project requires asbestos abatement in _____ phases. The project phasing and sequencing of events is shown on asbestos abatement drawings for this project. Asbestos contractor shall coordinate phasing with university and designer.
2. Scope of Work, Define each containment structure in detail with specific requirements for abatement of ACM. Each containment description shall include the materials scheduled to be removed, any special precautions required, the amount of material, the removal methods used and waste bag instructions. The section should reference the asbestos inspection report included as an Attachment. The scope of work should incorporate the intent of the abatement activities. If all of the ACM cannot be removed from the building, a statement shall be incorporated within the specification stating the type and amount of material to remain. If all asbestos debris cannot be removed from the crawlspace or a substrate, include a statement in the specification to describe final visual requirements.

C. ACM Products To Be Removed

In this section, list the ACM products to be removed during the asbestos abatement.



D. Asbestos Removal

Full containment removal of asbestos-containing materials:

1. After work area preparation is complete, contractor shall adequately wet asbestos-containing materials with a fine mist of amended water. Care shall be taken not to over saturate and allow excess dripping to pool on floor.
2. Contractor shall carefully remove manageable sections of asbestos-containing materials and place it directly into bags for disposal. Do not allow asbestos debris to accumulate on floor.
3. Contractor shall continue misting asbestos-containing materials with amended water throughout the removal process.
4. Contractor shall take all precautions necessary not to allow asbestos-containing material to free fall to the floor. Asbestos-containing materials may not free fall more than six feet.
5. Contractor shall clean work area as required by section 01711.
6. Where asbestos-containing pipe insulation extends beyond the containment boundary (i.e. tunnels), contractor shall remove insulation 2 inches into the floor or ceiling penetration and repair ends to remain in place with lag cloth.
7. Contractor shall remove asbestos-containing floor tile mastic using non-friable, non-regulated removal techniques. Asbestos-containing floor tile mastic shall be removed using a low to no odor solvent. Contractor shall use solvent sparingly for odor control.
8. Asbestos containing waste bags shall be transported from the work site to the dumpster after normal business operating hours such as before 8:00 am or after 5:30 pm.

E. Asbestos Containing Floor Tile and Mastic Abatement (Non-friable Removal Techniques)

1. Contractor shall remove asbestos-containing materials using hand tools and wet methods. No mechanical tools will be allowed for removal of asbestos-containing materials.
2. A system of HEPA-equipped air filtration devices shall be placed within the work area to minimize the odor associated with the heat treatment of the floor tiles and the mastic removal odor. The exhaust for the unit(s) shall be discharged outside of the building.
3. Critical Barriers: The contractor shall thoroughly seal the work area for the duration of the work by completely sealing off all individual openings and fixtures in the work area, including, but not limited to, heating and ventilation ducts, doorways, corridors, windows, skylights and lighting, with 2 layers (minimum) of 6-mil polyethylene sheeting taped securely in place. If the contractor is using sealant materials to fill in small holes or cracks, the material shall have appropriate fire ratings

3.04.12 Disposal of Asbestos-Containing Waste Material



A. General

1. All asbestos materials and miscellaneous contaminated debris shall be properly sealed and protected, and the loadout vehicle/dumpster shall be locked, while located on the facility site and then transported to a predesignated disposal site in accordance with 40 CFR 61.150 and DOT 49 CFR Parts 100-399.
2. An enclosed vehicle will be used to haul waste material to the disposal site. No rental vehicles or trailers shall be used. Vehicle selection, vehicle covers and work practices shall assure that no asbestos becomes airborne during the loading, transport and unloading activity, and that material is placed in the waste site without breaking any seals.
3. Waste disposal polyethylene bags (6 mil) and containers, non-porous (steel/plastic) drums or equivalent, with labels, appropriate for storing asbestos waste during transportation to the disposal site shall be used. In addition to the OSHA labeling requirements, all containers shall be labeled with the name of the waste generator and the location at which the waste was generated.
4. The contractor shall transport the containers and bags of waste material to the approved waste disposal site. The sealed plastic bags shall be placed into the burial site unless the bags have been broken or damaged. Upon the landfill's approval damaged bags shall be left in the non-porous containers and the entire contaminated package shall be buried. Uncontaminated containers may be reused.
5. Workers loading and unloading the asbestos will wear respirators and disposable clothing when handling material. Asbestos warning signs shall be posted during loading and unloading of asbestos waste.
6. The contractor shall use the HHCU's Waste Shipment Record for disposal records as per 40 CFR 61.150 and distribute a copy of all waste shipment records to the designer and HHCU after the completion of the project.

3.04.13 Project Decontamination and Work Area Clearance

- A. Carry out a first cleaning of all surfaces of the work area, including plastic sheeting and tools, by use of damp-cleaning and mopping and/or a high efficiency particulate air (HEPA) filter vacuum until there is no visible debris from removed materials or residue on plastic sheeting or other surfaces. Do not perform dry dusting or dry sweeping.
- B. Equipment shall be cleaned and all contaminated materials removed before removing polyethylene from the walls and floors.
- C. The contractor shall replace all prefilters and clean the inside and outside of the HEPA exhaust units.
- D. After polyethylene sheets have been removed from walls, but are still remaining on all windows, doors and the critical components, the contractor shall clean all surfaces in the work area, including ducts, electrical conduits, steel beams, roof deck, etc., with amended water and/or HEPA-filtered vacuum.



- E. After cleaning the work area, the contractor shall allow the area to thoroughly dry and then wet-clean and/or HEPA vacuum all surfaces in work area again.
- F. At the completion of the cleaning operation, the contractor's supervisor shall perform a complete visual inspection of the work area to ensure that the work area is dust- and fiber-free. If the supervisor believes he is ready for a final project decontamination inspection, he shall notify the designer.
- G. The designer shall contact the industrial hygiene firm and advise the firm of the final project decontamination inspection requested by the contractor.
- H. Final project decontamination inspection includes the visual inspection and air monitoring clearance.
- I. Visual inspection for acceptance shall be performed by the industrial hygiene firm after all areas are dry. The inspection shall be conducted following the guidelines set forth in the American Society for Testing and Materials, Standard Practices for Visual Inspection of Asbestos Abatement Projects, Designation: E1368.90.
- J. If the work area is found visibly clean, air samples will be collected by the industrial hygiene firm. Any discrepancies found shall be documented in the form of a punch list.
 - 1. During the air testing, the accredited air monitor shall cause disruptive air currents as described in the EPA-AHERA regulations (40 CFR Part 763, Subpart E, Appendix A).
 - 2. For exterior removal operations, no clearance air samples are required. However, contractor must pass final visual inspection prior to removing regulated area. Visual inspection shall be performed by the industrial hygiene firm.
 - 3. For interior removal operations, clearance air samples are to be analyzed using TEM, the Mandatory Transmission Electron Microscopy Method described in 40 CFR Part 763, Subpart E, Appendix F shall be used. Clearance criteria shall be an arithmetic mean less than or equal to 70 structures per square millimeter.
 - 4. The industrial hygiene firm shall immediately report the final air sampling clearance results to the designer.
 - 5. The use of the negative pressure system may be discontinued after the industrial hygiene firm instructs the contractor that he has passed the final project decontamination inspection.
- K. If the industrial hygiene firm finds that the work area has not been adequately decontaminated, cleaning and/or air monitoring shall be repeated at the contractor's expense, including additional industrial hygiene fees, until the work area is in compliance.
- L. After the work area is found to be in compliance, all entrances and exits shall be unsealed and the plastic sheeting, tape and any other trash and debris shall be disposed of in sealable plastic bags (6 mil minimum) and disposed of as outlined in Section 02080.13.00.



- M. All HEPA unit intakes and exhausts shall be wrapped with six-mil polyethylene before leaving the work area.
- N. After the industrial hygiene firm has approved the final project decontamination and the contractor has completed the tear down for occupancy by others, the designer shall perform the project final inspection as outlined in the general conditions.
- O. Any residual asbestos that may be present after removing critical barriers, which in the designer's judgment should have been cleaned during the pre-cleaning phase prior to installing critical barriers, shall be cleaned and cleared at the contractor's expense.
- P. There shall be appropriate seals totally enclosing the inspection area to keep it separate from clean areas or other areas where abatement is or will be in progress. Once an area has been accepted and passed air tests, loss of the critical barrier integrity or escape of asbestos into an already clean area shall void previous acceptance and tests. Additional visual and final air clearance sampling shall be required at the contractor's expense.

3.05 LABORATORY SINK TRAP AND OTHER INTERNAL BUILDING PIPING REMOVAL AND DISPOSAL

Sink traps existing in the building shall be properly removed and disposed. The traps are constructed of various types of materials including plastic and metal.

Prior to removal of the sink drain traps, the contractor shall rinse each drain line with an appropriate, pre-approved solution, such as a hypochlorite solution, that will decontaminate the line and stabilize the pH of the interior of the drain line. The solution shall not be injected into the drain or placed into the drain utilizing methodology that may disturb mercury caught in the sink traps. Next, the hot and cold water faucet handles will be opened fully to confirm the water has been shut off and residual water drains out of the faucet. The contractor will then completely close the faucets. The contractor will then wrap the faucet handles with yellow adhesive caution tape or tape labeled "Do Not Touch." Next, the sink drain trap will be properly removed such that the fluid and sediment which exists in the trap is contained. The fluid in the sink drain trap will be contained in a 1H1 5-gallon or 55-gallon container appropriately labeled. The sink trap will be appropriately cleaned and rinsed with water. The cleaning solution and the rinse water will also be contained in the same container. The container will be kept sealed after material is placed into it. Refer to Section 1, 1.12 - Mercury Spills and Contamination for monitoring and clearance information.

The contractor will store the 5-gallon buckets or 55-gallon drums in the staging area approved by UNC-EHS and coordinate disposal with the appropriate pre-qualified waste disposal contractor listed in Section 1, 1.14 - Hazardous and Universal Waste Disposal.

Following removal of the drain trap, the contractor will test the pH and mercury content of the drain line where the sink trap connected to the discharge end of the line. The results of the tests will be documented by the contractor (refer to Section 1, 1.15 - Project Testing Summary Reports). Next, the pipe will be plugged with a plastic or wood plug. The plug will be securely installed in such a manner that it will not inadvertently fall off during work on another section of the same pipe. If the pH of the pipe is between 5.5 and 8.5, the pipe will be sprayed with green spray paint in such a manner that the paint will remain on the pipe during removal. If the pH of the pipe is below 5.5



or above 8.5, the pipe will be sprayed with red spray paint (which indicates additional decontamination is required) in such a manner that the paint will remain on the pipe during removal.

3.06 FLOOR DRAIN REMEDIATION AND REMOVAL OF OTHER POTENTIAL MERCURY CONTAINING ITEMS

Floor drains existing in the building shall be properly cleaned by the contractor. The floor drains are generally constructed of metal. Sample sediment located in randomly selected floor drain traps at the subject property. The samples should be analyzed at a laboratory for the presence or absence of mercury.

The existing fluids in the floor drains shall be removed and placed in a 1H1 5-gallon container or 55-gallon drum by the contractor. Next, the sediment in the floor drain will be removed and contained in a 1A2 5-gallon drum or 55-gallon drum. The container(s) will be kept sealed after material is placed into it/them. The contractor will then cap the drain line. The floor drain and trap shall then be appropriately cleaned and rinsed with water. The cleaning solution and the rinse water will also be contained in the same container. The drain line cap will then be removed and the contractor shall rinse each drain line with an appropriate, pre-approved solution, such as a hypochlorite solution, that will decontaminate the line and stabilize the pH of the interior of the drain line. Refer to Section 1, 1.12 - Mercury Spills and Contamination for monitoring and clearance information.

The contractor will store the 5-gallon buckets and/or 55-gallon drums in the staging area approved by UNC-EHS and coordinate disposal with the appropriate pre-qualified waste disposal contractor listed in Section 1, 1.14 - Hazardous and Universal Waste Disposal.

The contractor will test the pH and the mercury content of the drain line. The results of the tests will be documented by the contractor (refer to Section 1, 1.16 - Project Testing Summary Reports). Next, the drain will be temporarily plugged with a plastic or wood plug. The plug will be securely installed in such a manner that it will not inadvertently fall off during work on or around the floor drain.

Manufactured or intrinsic items containing elemental mercury will be identified and removed by the contractor including, but not limited to, manometers and pressure gauges (i.e., Stokes McCleod gages), thermometers (also potentially located in ducts), pumps, switches (i.e., MERCROID switches) and thermostats. The contractor will segregate these items from other mercury-containing waste and manage them as hazardous and universal waste after they are removed. The contractor will arrange to have intrinsic items shipped to a recycler for recovery of mercury. UNC-EHS signature is required on all shipping document.

3.07 MERCURY ABATEMENT

3.07.1 Delegation of Authority

UNC's Project Officer, a representative of the Department of Environment, Health & Safety, and asbestos/hazardous material design representative are assigned to be technical authorities to the project by the UNC Contracting Officer. They may seek the services and assistance of a qualified environmental firm for air monitoring, mercury identification and decontamination, waste determination methodologies, and general guidance on lab decommissioning strategies.



3.07.2 Security, Special Equipment, Materials and Reagents

- A. The appropriate personal protective equipment (PPE) will be provided by the contractor to all approved visitors to the site. The contractor will keep a log of visitors at the primary entrance to the worksite with the dates and times of their visit to the building.
- B. Warning signs and labels shall be posted for the duration of the work, which restrict access to “off limits” areas to authorized personnel only. Warning signs identifying mercury decontamination procedures shall read “Caution: Mercury decontamination in progress. Do not enter!” Doors or entranceways to areas where decontamination is in progress or final clearance has not been achieved will be sealed with polyethylene sheet plastic, yellow caution tape, and the aforementioned warning sign posted at the entrance.
- C. Mercury testing as described herein will be the responsibility of the contractor and will employ an OhioLumex RA-915+ Mercury Analyzer for the determination of mercury vapor concentrations in the air, specifically to ensure that the project and regulatory action levels are accurately measured. The OhioLumex is a portable and highly sensitive atomic absorption unit with Zeeman background correction for the elimination of interferences. The instrument has proven to be reliable and effective for measuring mercury vapor levels in a demolition environment and for assessing the progress and effectiveness of decontamination procedures in an indoor environment. Attachments for performing liquid and solid mercury analyses are available from the manufacturer, but are not required.
- D. Materials and reagents used in the execution of the contract shall be used as specified by the manufacturer’s written instructions. All products will comply with UNC’s fire safety requirements for use and storage. Material Safety Data Sheets (MSDSs) will be submitted as part of the contractor’s site specific health and safety and waste minimization plans. In addition, MSDSs will be posted in accessible locations at the worksite including the primary entrance used by visitors to the building. Hazardous material storage areas will be placarded with the appropriate signage, properly ventilated, and locked when not in use.
- E. Commercial materials and reagents will be properly transported to the site at the outset of the project and removed from the building and campus, when they are no longer needed. Prolonged storage or maintenance of excessive quantities of hazardous materials shall be strictly avoided. The contractor will be responsible for promptly transporting unused materials away from the UNC campus during the final project demobilization.
- F. Containers will be provided by the contractor and shall comply with all transportation requirements provided in 49 CFR (DOT regulations) for the shipment of hazardous substances. Contractor is required to subcontract an approved UNC-Chapel Hill hazardous waste disposal contractor for disposal of hazardous waste generated under this contract.

3.07.3 Execution of Mercury Abatement

- A. Preparation of Work Areas- Contaminated and Non-contaminated Labs/Rooms
 - 1. The results of the mercury survey of all spaces to be renovated will determine what areas will be sealed and access restricted to contractor hazardous material (HazMat or mercury abatement) workers.



2. Labs and areas of the building with breathing zone (BZ) or surface mercury vapor concentrations greater than the ASAL will be restricted by sealing the entrance(s) with polyethylene sheet plastic and barrier tape, and by prominently labeling the room contaminated by painting a green or yellow “Hg” on the outside of the room, preferably at the sealed entranceway.
 3. Labs and areas where BZ measures are below the ASAL will be considered non-contaminated. These portions of the building will be released for unrestricted contractor access with regards to mercury contamination but may require removal of casework, etc., if the demolition plans call for asbestos abatement and/or an interior gut of that section of the building.
 4. Work area delineation will be reviewed and inspected by the Contractor’s Environmental Health and Safety Manager. More specific delineation of the extent of contamination within each lab/room will be a primary function of the EHSM in order to minimize the area that requires treatment, as well as the materials expended in the process.
 5. Visible mercury spills, once they are discovered, must be immediately cordoned off. These spills will be assigned the highest priority for clean-up. Contractor workers shall be trained on how to identify mercury spills and shall report them immediately to the EHSM, so the area can be cordoned off and arrangements made for suitable clean-up.
 6. Work areas will be isolated by the contractor through the use of plastic sheeting, duct tape, and signage. Critical barriers will be constructed in the contaminated labs and rooms covering ceilings and walls using with sheet plastic. Entrances will also be closed off with plastic. These barriers will be similar to those described in the Asbestos Abatement Specification (Section 02080; subsection 5.01). Since mercury spills are frequently found between and under asbestos floor tile and mastic, laboratories in which vinyl asbestos tile may require removal of the floor tile and mastic before it can be effectively decontaminated.
 7. Every effort will be made to ensure that elevated concentrations of mercury vapor, typically encountered when spilled mercury is disturbed, are not allowed to escape into occupied areas of the building. Therefore, all air handling/HVAC units will be shutdown before beginning decontamination. Vents and intakes will be covered with polyethylene plastic sheet. Should the mercury air concentrations approach the TLV, the contractor will immediately install negative air HEPA filter exhaust units to increase the air circulation in the work area, which will be exhausted outside of the building.
 8. Before chemical decontamination of labs is begun the area must be cleaned and free of all removable items, equipment, and casework. All items that are not removed or are to be left in place, per the renovation plans, will be covered with sheet plastic.
 9. Inspection of the work area for visible mercury requires vigilance and is an ongoing process. It should be an objective of the contractor. Mercury may be found behind or under casework as it is removed, inside sanitary plumbing pipes, and behind metal partitions, and pipe chases. The EHSM will cordon-off spills as they are discovered, record initial mercury vapor concentrations in both the BZ and on the surface containing the spill, and obtain post-decontamination measurements after the spill has been cleaned-up.
- B. Wastewater Sanitary Drains and Pipe Contaminated with Mercury
1. The preliminary mercury survey of areas to be renovated will have as one of its objectives the identification of sink drains that have mercury vapor readings above the ASAL. The EHSM will verify readings from suspected sinks using the OhioLumex and mark them for removal.



2. Before removal of any of the sanitary lines, the contractor will ensure that plumbing is not allowed to drain to the sewer or that the sanitary mains leaving the building are isolated from the sewer to avoid accidental discharges of mercury.
3. Laboratory sink traps are common sources of mercury. All sink traps in areas of the building to be renovated will be removed as the initial remediation activity. Refer to Section 3, 3.05 - Laboratory Sink Trap and Pipe Removal and Disposal for additional information. The contractor must exercise caution when removing sink traps, as they may contain significant quantities of mercury that can be spilled spreading contamination. In addition, sink traps are known to form chemical by-products that are established reactive hazards. These heavy metal azides are friction sensitive as dry crystals and have documented cases where they have detonated, usually when dried plumbing was unscrewed at the threaded joints. Heavy metal azides form, when sodium azide, a common preservative used in numerous biochemical preparations, reacts with the metal in the pipe, especially copper and lead. Sink traps should be inspected carefully for the presence of crystalline deposits around the joints and should only be removed by cutting with a saw above and below the threaded joints and only when the trap is wet! It is strongly recommended that copper and lead traps (i.e., bench cup sinks) should be isolated and removed by a qualified explosion hazard expert wearing body arm and a face shield when crystals are found or suspected to exist. Problems are generally not encountered with newer pipe, especially PVC or plastic pipe.
4. Plastic or PVC pipe will be monitored at both cut ends using the OhioLumex. If the vapor readings are less than the ASAL, the pipe may be disposed as no-regulated solid waste in a dumpster.
5. All sanitary pipes, including sink traps, should be cut using a saw and only if the pipe is wet. The use of torches and other hot methods are strictly forbidden. The cutting of lead pipes must adhere to the Lead in Construction Standard 29 CFR 1926.62. The standard requires application of certain health and safety provisions (i.e. biological monitoring, employee training, and exposure control including respiratory protection). The area beneath the cut should be prepared with a plastic pan or with polyethylene sheeting to prevent the contents of the pipe from spilling mercury or mercury-contaminated water on the floor or base of the cabinet. Cut ends will be sealed with polyethylene plastic and duct tape before they are placed in the appropriate disposal container. Pipe stubs that are left in the wall below the sink will be sealed with polyurethane foam to prevent the evolution of mercury vapor should the pipe be contaminated downstream of the cut. All sanitary pipes will be cut to appropriate lengths for placement in the waste containers selected and by the contractor and approved by the owner and designer.
6. Wastewater in sink traps, p-traps, or other sanitary drain lines will be collected by carefully decanting it into a hazardous waste container. Residue in the trap or length of pipe should remain in the pipe as it may contain the greatest amount of mercury. Mercury is known to amalgamate with various metals and is, therefore difficult to remove from metal pipe. Metal traps that are removed, after decanting the water, shall have both open ends sealed before placing them in a hazardous waste drum for shipment to a mercury retort facility. Pipe, especially metal pipe, shall not be power or pressure washed, unless the pipe is to be abandoned-in-place and only after proposed procedures and assurance of water collection is approved by the owner/designer, and their technical representatives.



7. Wastewater collected from sanitary piping will be analyzed for RCRA-8 metals, pH, and other pollutants or physical properties required by UNC's wastewater discharge permit. The discharge limit for mercury is 0.012 mg/L, although the analytical results of all metals shall be used to determine whether or not the water may be discharged to the sewer without a permit. Wastewater will be stored in the approved satellite accumulation area in labeled DOT drums or portable tanks pending the results of analysis.
 8. Sanitary pipe entering the basement slab of the building will be abandoned-in-place after cutting the pipe flush with the slab elevation. The preferred option is to remove the piping. Once cut the sanitary penetrations will be tested for the presence of mercury vapor using the OhioLumex. Pipe that has elevated mercury vapor levels (>ASAL) will be power washed to remove free elemental mercury or contaminated liquid after cutting the pipe at the service point closest to the building to avoid discharging potential slugs of mercury to the sewer. Wash water that is collected will be tested as noted in item 7 above. UNC will determine the need for additional work involving the removal of slab embedded sanitary pipe or pipe exiting the building.
- C. Surficial Decontamination
1. Surface areas, floors, and items with mercury vapor surface reading above the ASAL, 250 nanograms per cubic meter (ng/m^3) in the initial survey will be cleaned/decontaminated. It is recommended that contaminated sanitary pipe be removed prior to decontamination of floors and cabinets, so as to avoid repeated cleaning of these surfaces.
 2. Elemental mercury that is visibly identified will be removed along with potentially contaminated debris using a mercury vacuum cleaner or other free mercury collection apparatus. Mercury vacuums are designed to prevent dispersion of hazardous vapors into the work area during their use. Waste collected by vacuuming will be disposed of by removing the collection bag and placing it in a container for mercury retort waste.
 3. No attempt will be made to decontaminate porous materials, such as carpeting, since they are difficult to clean and, therefore will be disposed of in the hazardous waste container as they are removed provided monitoring indicates that the PDCL is exceeded.
 4. An effective decontaminating solution will be used by the contractor to wash all nonporous surfaces that monitor with the OhioLumex above the PDCL. Chemical decontaminants should be selected that are not odiferous (e.g., sulfurous reagents) or extremely hazardous to use. Decontaminants or rinse solutions should be selected based on their effectiveness extracting or removing mercury or the products formed from the reaction with the decontaminant from the surface being cleaned. A decontaminant that is easily applied to various surfaces and that possesses vapor suppressant properties is highly recommended. UNC understands that all decontamination approaches are problematic and may require case-by-case selection and validation. Disposal of decontaminant wastewater and wash solutions as hazardous will be determined from the results of aforementioned wastewater analyses.
 5. The contractor will complete air clearances in each work area at the completion of remediation activities to document the effectiveness of the remediation and decontamination activities. The contractor shall verify that mercury levels in the building are below the decontamination clearance level of $1,000 \text{ ng}/\text{m}^3$ utilizing air monitoring equipment. The air monitoring equipment should be able to accurately detect mercury vapor at $2 \text{ ng}/\text{m}^3$. The clearance tests will be completed by dividing the work area into a grid of 2'x2' squares. The contractor will collect air



- samples approximately two inches above the cleaned surface and in the center of each grid square, documenting the results. A sample location map should be completed indicating sample location, sample time and sample concentration. The contractor shall also complete a Project Testing Summary Report (refer to Section 1, 1.15 - Project Testing Summary Reports) including the air monitoring instrument manufacturer, model number, calibration date and other pertinent information. If each of the clearance air samples is not $\leq 1000 \text{ ng/m}^3$, the contractor will re-clean the area and complete a second round of clearance testing, utilizing the same procedures listed above. The contractor will continue this process until successful clearance is obtained.
6. A TCLP or total mercury composite sample may be analyzed in some cases. Materials that analyze below the TCLP or total mercury action levels will be released for disposal as non-regulated construction debris. Representative TCLP or total metal samples will be documented for the purpose of compliance with hazardous waste regulations. Materials that fail TCLP or total mercury will be managed as hazardous waste and disposed of in the proper container.
 7. Floor tile and mastic that are found to be contaminated using the project guidelines will be removed by the contractor, placed in sealed polyethylene bags as described in the Asbestos Abatement Section for disposal as low-mercury contaminated waste. It is important to note that mercury spills frequently occur on floors. Mercury breaks up into very tiny droplets or beads that easily lodge between and under tiles, and in cracks and crevices. Therefore, the mercury abatement contractor will also be required to remove vinyl asbestos floor tile, where it exists.
 8. Once areas or laboratories are cleared to below the PDCL, the status and date of clearance should be recorded in a field log, along with the mercury vapor readings. Post-decontamination measurements shall also be reported in the final project report along with the pre-decontamination survey vapor concentrations taken from the same area. Decontamination procedures should be thoroughly documented for future project planning purposes at UNC.
- D. Air Sampling and Laboratory Analytical Results
1. The contractor will maintain a field/project log of air sampling performed and solid and liquid samples submitted to an EPA accredited analytical laboratory. Results of all tests will be recorded with the samples. At a minimum the log should include:
 - a. Sample type
 - b. Name of sampler or the Contractor's Environmental Health and Safety Manager
 - c. Date and time of collection
 - d. Sampling location
 - e. Analytical methods employed
 - f. Laboratory results, reports, and pertinent qualifiers, and QC tests
 - g. OhioLumex readings should be reported in the appropriate concentration units (ng/m^3) along with the instrument recorded % deviation for mean vapor concentrations obtained.
- E. Final Survey



1. A final survey will be conducted to determine how clean the building is before renovations are initiated. Mercury vapor air monitoring is to be repeated in all areas at the conclusion of the D&D activities. For those areas that are not to undergo complete interior gut; piping, mechanical systems, laboratory casework, and debris should be cleared from the area before the final survey is conducted. The level of complexity of this survey shall be determined between the contractor and the owner and designer, but at a minimum should clearly define the effectiveness of the decontamination procedures used by measuring average mercury vapor air readings obtained from all cleaned areas and/or floors of the building. In addition, the contractor will be asked to record Time Weighted Averages (TWAs) over an 8-hour period of mercury air concentrations in defined spaces including open floors using the OhioLumex. TWA software is supplied by the manufacturer of the instrument that automates this process.
- F. Packaging, Labeling, and Storing Hazardous Materials On-Site
1. Hazardous wastes will be accumulated in full accordance with the regulations and in DOT approved and labeled containers. The accumulation area will be placarded on the outside with the appropriate warning signs and kept locked, when not in use. It will be the responsibility of the Contractor's Environmental Health and Safety Manager, and ultimately the contractor, to properly manage and inspect the accumulation area. Other provisions guiding hazardous waste protocols are referenced elsewhere in this specification.
- G. Shipping Hazardous Waste Off-Site
1. Contractor is required to subcontract an approved UNC-Chapel Hill hazardous waste disposal contractor for disposal of hazardous waste generated under this contract. Hazardous Waste Manifests: Uniform Hazardous Waste Manifests (EPA Form 8700-22 or the latest revision) shall be completed by the contractor for each waste shipment and shall list the waste and transportation containers type. Manifests will contain UNC's EPA ID Number and must be signed by the representative of UNC's Department of Environment, Health and Safety (EHS) responsible for hazardous waste on campus. The owner and EHS representative may inspect all shipments before signing manifests. Copies of landfill receipt of shipment will also be provided to EHS.
 2. DOT Emergency Response Information Requirements: The contractor and his transporter must comply with applicable DOT Emergency Response Communication Standards for shipments of all hazardous waste.
 3. Permitted Treatment, Storage, and Disposal Facilities (TSDF): All treatment, storage, and disposal facilities (TSDF) must be pre-approved by UNC and shall be permitted to receive and handle the waste types shipped to them. All facilities will have a minimum of an EPA and state approved interim status permit showing the EPA hazardous waste numbers for each waste type the facility is permitted to handle as required by the provisions of 40 CFR 261, Subparts C and D. Mere acceptance of the waste by a permitted facility does not meet the contract requirements for final treatment and disposal under this contract. Records of ultimate disposition of the waste are required.
- H. Cleanup and Housekeeping
1. An essential aspect of managing hazardous materials and hazardous waste, as well as properly conducting decontamination operations, is good housekeeping. Surfaces must be free of dirt and debris in order to be effectively decontaminated and to prevent dispersion of contaminants.



Workers must be meticulous in cleaning their areas on a regular basis. A thorough cleanup of the work spaces will be conducted before the final survey is performed.

2. Final Cleanup and Site Demobilization: The Contracting Officer and owner's representatives will inspect the work areas for approval of mercury cleanup. All hazardous materials and waste will be removed or shipped from the facility before the contractor demobilizes.

3.08 REMOVAL AND DISPOSAL OF COMPONENTS PAINTED WITH LEAD-CONTAINING PAINT OR SURFACE COATINGS

3.08.1 Lead Inspection

A lead inspection must be conducted prior to removal of lead-containing components. During the inspection, lead testing should be done for building materials such as ceramic floor and tile, window sashes and components including metal lintels, exterior doors and exterior door components, interior door headers and casings, wood baseboards, wood crown moldings, wood chalk board casings, painted metal stair railings including balusters, railing caps and newel posts, stair treads, stair risers and stair stringers, radiators and the dumb waiter.

3.08.2 Removal of Lead-Containing Components

The contractor/employer shall adhere to the OSHA Lead in Construction Standard 29 CFR 1926.62 during the removal of components containing any detectable amounts of lead.

- A. The contractor/employer will be responsible for conducting employee exposure monitoring and training, and providing employees with respirators and other personal protective equipment during exposure monitoring as defined by the standard. Negative exposure data collected within twelve months of the construction work and during similar work conditions, lead-containing material, and lead content may be used to substantiate no exposure to employees and building occupants.
- B. The contractor/employer will be responsible for implementing the health and safety measures required by the standard if airborne lead concentrations equal or exceed the Action Level ($30 \mu\text{g}/\text{m}^3$).
- C. The contractor/employer shall ensure the airborne lead concentrations do not exceed the Permissible Exposure Limit (PEL) of $50 \mu\text{g}/\text{m}^3$. If concentrations exceed the PEL, engineering controls such as local exhaust or mechanical ventilation shall be utilized.
- D. In areas of peeling lead-containing paint, wet scraping or an approved alternate control measure shall be used to remove the chips. The remaining surface shall be stabilized with a paint coating approved by the architect.
- E. Lead-containing painted steel that must be removed with saws or torches must be abated prior to removal.



- F. For work conducted within or near occupied buildings, the contractor/employer shall protect building occupants by sealing shared air supply and exhaust vents, constructing rigid barriers for jobs exceeding 3 days, implementing dust control methods, and creating negative pressure within the work area.
- G. The contractor/employee shall prevent waste water containing paint chips from entering storm drains.

3.08.3 Disposal of Lead-Containing Components

TCLP testing must be conducted prior to disposal of lead-containing components. Components that fail TCLP testing will be collected, and stored in a sealed and labeled container. These containers must be stored in a locked area and EHS must be called for a hazardous waste pickup (Mike Long 962-5723).

Also refer to the UNC Design and Construction Guidelines for further information including Chapter IV – Supplemental Guidelines – Section B – Hazardous Material Guidelines – Sub-Section 2 – EHS General Procedures for Paint Film Stabilization.

3.09 DEMOLITION OF SELECT WALLS, CEILINGS AND FLOORS

The contractor shall demolish walls, ceilings, floors and other barriers as necessary to obtain access to sewer piping and fume hood ducts. Demolition of lead-containing materials shall adhere to the Lead in Construction Standard 29 CFR 1926.62 as listed in Section 3, 3.08 - Removal and Disposal of Components Painted With Lead-Containing Paint or Surface Coatings. Demolished materials shall be recycled as applicable. The contractor shall coordinate disposal of material with the appropriate pre-qualified waste disposal contractor listed in Section 1, 1.14 - Hazardous and Universal Waste Disposal. The cutting of walls, floors and ceilings shall be completed in a manner so as to not endanger the stability of any part of the structure. The contractor shall not, in any case, cut or alter the work of another contractor without the approval of, and under the direction of, the designer. The Superintendent of the Contractor shall supervise all repairs resulting from cutting, as necessary.

Wall, ceiling, floor and roof cuts shall be completed neat, straight and square to accommodate future patching and/or repair. Cuts should run in horizontal and vertical directions. No main structural members shall be cut or disturbed without prior authorization by the UNC Engineering Department and the designer.

Plastic sheet barriers shall be installed on the doors of each room where work will be completed to limit the migration of dust. Rigid barriers shall be installed for projects exceeding 3 days. The contractor shall clean work areas using appropriate methods following demolition. The work areas should be clean and free of debris and dust following cleaning activities. The barriers shall be removed when demolition and clean-up is complete.

Refer to the UNC Design and Construction Guidelines for further information including Chapter V - Technical Design and Performance Standards – Division I, General Requirements – Section 01045 – Cutting and Patching and Section 01060 – Regulatory Requirements. Also refer to the AIA Specifications included in Section III – AIA Specifications - Section 01731 – Cutting and Patching and Section 01732 – Selective Demolition for additional information.

3.10 DECONTAMINATION, DISMANTLING AND DISPOSAL OF FUME HOODS AND FUME HOOD EXHAUST PIPING



The contractor will decontaminate, dismantle and dispose of the fume hoods, fume hood cabinets and fume hood exhaust piping/duct work including exhaust fans. UNC does not have reliable data as to the type and concentrations of chemicals used in the fume hoods. Thus, the contractor should use extreme caution during decontamination and dismantling operations. During demolition, it is possible that additional and/or auxiliary fume hood exhaust lines may be encountered. These lines should also be decontaminated, dismantled and disposed as identified in this section.

3.10.1 Disconnection and Termination of Fume Hood Electrical Connections

Electrical connections to the fume hoods and exhaust systems shall be powered down and disconnected according to federal, state and local codes, regulations and statutes. The contractor should follow appropriate lockout/tagout procedures. The power for this equipment shall be terminated at the main power panel utilizing breakers. The electrical wires shall be capped, taped and labeled appropriately.

3.10.2 Sampling of Fume Hoods and Fume Hood Exhaust Systems

The contractor shall test the fume hoods and exhaust system for perchlorates (perchloric acids), peroxides/oxidizers, acids, metals, salts and other substances that may impact the fume hoods and exhaust systems sensitivity to impact, shock or temperature during demolition. The contractor shall conduct the appropriate testing as required by federal, state and local regulations, statutes and guidelines and to the extent necessary, for the contractor to protect the workers. At a minimum, the contractor will complete rinsate testing in the fume hoods, ducts and the exhaust systems using methylene blue to identify the presence or absence of perchlorate. The contractor shall also complete, at a minimum, testing in the fume hood, ducts and the exhaust systems for the presence or absence of peroxides and oxidizers utilizing peroxide test strips. Samples should be obtained from the lowest points in the ductwork where hot perchloric acid vapors are most likely to have crystallized. If a test is positive for the presence of one of these materials, the contractor will complete additional testing to quantify the amount and types of material that are present using the quantitative procedure developed by Brookhaven National Laboratory (Brookhaven National Laboratory, Safety & Health Services Division, Industrial Hygiene Group, *Perchloric Acid Sampling and Analysis Procedure, No. IH75200*, September 28, 2001.). The results of the tests will be documented by the contractor (refer to Section 1, 1.16 - Project Testing Summary Reports).

3.10.3 Decontamination and Dismantling of Fume Hoods and Fume Hood Exhaust Systems

The contractor will complete dismantling of the fume hoods and duct and exhaust systems utilizing methods appropriate for the materials identified during testing. The contractor shall minimize impact, shock and high temperatures during dismantling of the fume hoods, ducts and exhaust systems.

Fume hoods and duct and exhaust systems which contain elevated levels of chemical compounds shall be decontaminated. The contractor shall implement a decontamination plan to address multiple compounds. Absorbents, buffering compounds, neutralizing agents and or solvents or other items may be used at the contractor's discretion for the decontamination procedure along with atomizers, sprayers, washers and wipes. Hazardous waste created during decontamination shall be appropriately contained. The contractor shall coordinate disposal of material with the appropriate pre-qualified waste disposal contractor listed in Section 1, 1.14 - Hazardous and Universal Waste Disposal.

3.10.4 Disposal of Fume Hoods and Fume Hood Exhaust Systems



Materials shall be recycled as applicable. The contractor shall coordinate disposal of material with the appropriate pre-qualified waste disposal contractor listed in Section 1, 1.14 - Hazardous and Universal Waste Disposal.

3.11 COMPRESSOR OILS

The contractor will drain and contain compressor oils. The contractor shall coordinate disposal of the compressor oils with the appropriate pre-qualified waste disposal contractor listed in Section 1, 1.14 - Hazardous and Universal Waste Disposal.

Refer to American Institute of Architects (AIA) Specifications included in Section III – AIA Specifications - Section 011110 – Summary of Work, Section 01733 – Demolition and Construction and Section 01770 – Close Out Procedures for additional information.

3.12 MISCELLANEOUS CHEMICALS

Chemicals identified during this work should be handled as hazardous waste and contained and packaged in approved UN waste containers. Some examples may include cylinders, bottles, containers with unidentifiable liquids, spill clean-up residue, etc. The contractor should immediately contact UNC-EHS when a miscellaneous chemical is discovered.

The contractor shall coordinate disposal of the materials with the appropriate pre-qualified waste disposal contractor listed in Section 1, 1.14 - Hazardous and Universal Waste Disposal.

Refer to the UNC Design and Construction Guidelines for further information including Chapter IV – Supplemental Guidelines – Section B – Hazardous Material Guidelines – Sub-Section 6 – Hazardous and Universal Waste Issues.



APPENDIX I – ACRONYMS

ACGIH = American Conference of Governmental Industrial Hygienists
ACM = Asbestos-Containing Materials
AHERA = Asbestos Hazard Emergency Response Act
AIA = American Institute of Architects
AIHA = American Industrial Hygiene Association
ANSI = American National Standards Institute
ASAL = Air Survey Action Level
ATSDR = Agency for Toxic Substances and Disease Registry
BZ = Breathing Zone
CDC = Center for Disease Control and Prevention
DOT = Department of Transportation
EHSM = Environmental Health and Safety Manager
EPA = Environmental Protection Agency
GFCI = Ground Fault Circuit Interrupter
HEPA = High Efficiency Particulate Air
HHCU = Health Hazards Control Unit
HVAC = Heating, Ventilation, and Air Conditioning
IEEE = Institute of Electrical and Electronic Engineers
LDR = Land Disposal Restrictions
MSDS = Material Safety Data Sheet
MSHA = Mine Safety and Health Administration
NC DEHNR= NC Department of Environment, Health and Natural Resources
NC DHHS = NC Department of Health and Human Services
NEC = National Electric Code
NEMA = National Electrical Manufacturers' Association
NESHAP = National Emission Standard for Hazardous Air Pollutants
NFPA = National Fire Protection Association



NIOSH = National Institute for Occupational Safety and Health

NSF = National Science Foundation

OSHA = Occupational Safety and Health Administration

OSHANC = Occupational Safety and Health Act of North Carolina

OWRR = Office of Waste Reduction and Recycling

PAPR = Powered Air Purifying Respirators

PCM = Phase Contrast Microscopy

PDCL = Post Decontamination Air Clearance Level

PEL = Permissible Exposure Limit

PPE = Personal Protective Equipment

RCRA = Resource Conservation and Recovery Act

SAM = Supervising Air Monitor

SWMP = Solid Waste Management Plan

TCLP = Toxicity Characteristic Leaching Procedure

TEM = Transmission Electron Microscopy

TLV = Threshold Limit Value

TSDF = Treatment, Storage, and Disposal Facilities

TWA = Time Weighted Average

UL = Underwriters' Laboratories

UNC-EHS = University of North Carolina Environment, Health, and Safety