OFFICE OF ENVIRONMENTAL HEALTH AND SAFETY

CHEMICAL/BIOLOGICAL SAFETY SECTION

University Asbestos Operations and Maintenance Plan

Asbestos Management Plan (under Construction)

(revised 10/11/12)

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I. SCOPE & APPLICATION

A. Purpose:

1. To limit staff asbestos exposure: Asbestos is a naturally-occurring mineral which is classified as a carcinogen by the Environmental Protection Agency (EPA), the Occupational Safety & Health Administration (OSHA) and several other listings maintained by governmental regulatory agencies. Exposure to asbestos fibers, primarily through the inhalation route, may increase the risk of developing several forms of cancer and other life-threatening and/or debilitating diseases. For additional information concerning the health affects of asbestos exposure refer to: EPA Asbestos Information Page, OSHA Asbestos Health & Safety Topics Page, or the OEHS Asbestos Information Page.

2. To standardize methods of asbestos-containing material (ACM) management throughout university buildings through:

a. Maintaining regulatory guidance documentation and recordkeeping based upon applicable federal and state regulations.

b. Maintaining policies for the identification, assessment and periodic surveillance of ACM.

c. Maintaining a system for providing readily accessible information regarding asbestos related health issue to university staff, with vehicles including:

I. The OEHS website.

ii. Training programs & seminars.

iii. Posting of signage.

iv. Personal communication, through:

- Conducting inspections and site visits.

- A mandatory maintenance/construction activity notification and review system.

v. Standard operating procedures (SOPs) for emergency response to fiber release episodes.

d. Providing guidance for PPE selection and mandating training for all university staff issued respirators (for training information refer to VCU Respiratory Protection Plan).

e. Ensuring development of asbestos abatement project designs by Virginia-licensed Asbestos Project Designers, which comply with governmental regulatory requirements.

f. Requiring properly accredited project monitors on all significant "Class I and Class II" asbestos abatement projects taking place within university and hospital buildings: project monitors retained from contracted firms must possess valid Virginia Project Monitor Licensure, OEHS project monitors must possess a minimum of valid EPA Project Monitor accreditation.

B. Limitations:

1. The O & M Plan is a required element of the more comprehensive Asbestos Management Plan (MP) that has been mandated for all public buildings by the EPA and the Virginia Department of General Services (DGS). The university MP is currently under construction – as other required elements are completed they will be attached to this document/webpage. Until all elements of the MP are completed the combined document will be referred to as the "university O & M Plan."

2. The university O & M Plan is intended to function in conjunction with all other university health and safety programs - in all instances where more stringent requirements are called for by governmental regulatory and/or credentialing agencies, the requirements of this document shall be superseded.

C. Application:

1. Order of Precedence: The order of precedence of this program shall be:

a. Federal Regulations.

b. State Regulations.

c. Credentialing agency requirements.

d. VCU O&M Program (this document).

e. Other University Guidelines.

2. Where inconsistencies exist between any of the above-listed sources, the most stringent, engineering control, personal protective equipment, and general health and safety requirements shall be followed.

3. Affected Population: This program shall apply to all employees of Virginia Commonwealth University (VCU) and VCU Medical Center (VCUMC). Contracted employees are also required to comply fully with the conditions of this program and all other applicable federal, state and local regulations.

4. Affected Properties: This program applies to all VCU (“university”) and VCUMC (“hospital”) owned and leased properties.

II. Program Responsibilities:

A. Asbestos Program Manager: Mike Elliott (400-4984):

1. Reviews content and assists VCU Occupational Lead Compliance Officer as needed in the coordination and provision of Level 1 asbestos O & M training for university and hospital personnel.

2. Interfaces with VCU Facilities Management, Architectural Services, Physical Plant and other key university entities on asbestos abatement projects.

3. Implements, maintains, and updates Campus Asbestos Management Plan.

4. Tracks regulatory and technical issues relating to asbestos.

5. Assists Asbestos Inspector in routine asbestos management program operations.

B. Asbestos Program Inspector: Dave Patterson (827-0348)

1. Maintains records (database) of locations of asbestos-containing building materials (ACBM).

2. Conducts periodic asbestos inspections including collection of bulk samples for analysis.

3. Assists in providing asbestos training to campus employees.

4. Performs air sampling for quantification of asbestos fiber count.

5. Reviews asbestos inspection records for completeness.

6. Interfaces with regulatory agencies on matters relating to asbestos.

7. Reviews critical elements of contractor submittal documents.

8. Tracks regulatory and technical issues relating to asbestos.

9. Provides quality control on all abatement projects.

10. Performs asbestos project monitoring services (as needed).

11. Prepares asbestos removal designs (as needed).

12. Assists in conducting periodic reinspections in relation to Management Plan.

13. Oversees Asbestos Abatement Team members acting as project monitors on university abatement projects.

C. Support Staff (OEHS)

1. Provide assistance on routine asbestos program management activities.

2. Administer university respiratory protection program.

D. VCU Facilities Management (FMD)/VCU Construction Management

1. Zone Maintenance Managers:

a. Serve as liaisons for coordinating asbestos related activities within buildings under their charge.

b. Report any activities which have the potential for the disturbance of asbestos-containing materials within buildings under their charge.

2. Construction Managers/Inspectors:

a. Administer campus contracts for asbestos abatement.

b. Contact OEHS prior to beginning construction projects with potential for disturbing asbestos-containing materials.

c. Maintain asbestos waste manifests for all managed/contracted asbestos abatement projects – provide copies of manifests to OEHS for inclusion in asbestos database.

E. VCU Asbestos Abatement Team (AAT)

1. Perform small-scale asbestos operations and maintenance jobs to limit potential exposure hazard to university staff.

2. Assist Asbestos Inspector in performing periodic O & M inspections (steam tunnels, other areas to be determined at later date).

3. Provide emergency response to incidents involving ACM.

4. AAT Supervisor: Coordinates training and medical examinations, maintains training and medical records for AAT.

5. Assist (as needed) Asbestos Inspector on abatement projects requiring project/air monitoring services.

F. University Staff

1. Report all incidents involving asbestos and/or suspected asbestos exposure threats to supervisors and OEHS (OEHS asbestos emergency lines, work hours: 828-9384, after hours: 828-0951).

2. Participate in appropriate level of awareness training for employment position (consult with supervisor to determine training needs).

3. Follow the standard operating procedures established within this management plan.

III. BUILDING INSPECTION REQUIREMENTS

A. Regulatory:

1. Presumed asbestos-containing materials (PACM) must be surveyed by an accredited inspector prior to being disturbed in relation to maintenance, demolition and/or renovation projects. Surveys conducted prior to conducting activities with the potential for disturbing PACM within university buildings must comply with federal and state regulations including (but not limited to) the following guidelines:

a. 29 CFR 1910.1001 - OSHA General Industry Asbestos Standard.

b. 29 CFR 1926.1101 - OSHA Construction Industry Asbestos Standard.

c. Department of General Services (DGS) Asbestos Survey Standard for Buildings to be Renovated or Demolished.

d. 40 CFR 61 - EPA Asbestos NESHAP.

e. 40 CFR 763, EPA AHERA.

2. If any asbestos-containing materials are identified in the facility during this inspection, the Office of Environmental Health & Safety shall be consulted to ensure that a proper course of action (including removal strategies, work practices, engineering controls, and notification) is followed per state and federal regulations, and the University Asbestos Removal Guidelines (Appendix D).

B. Inspection Criteria:

1. No VCU buildings shall be considered exempt from asbestos inspection requirements based on construction or renovation date (buildings, or building areas shall only be considered to be “asbestos free” if so designated in Appendix B.1 or Appendix B.2, or if verified to be so in writing by OEHS).

2. All asbestos surveys conducted within university buildings will be performed in accordance with random and multiple sampling schemes as described within the Asbestos Hazard Emergency Response Act (AHERA).

3. Sampling will be conducted per OSHA and EPA acceptable techniques with appropriate steps taken to limit related fiber release and exposure threat to university staff.

4. All individuals engaged in the sampling of suspected ACM within university buildings must meet federal and state training and certification requirements.

5. All asbestos-related information gathered by contracted outside environmental testing firms will be submitted to OEHS for review and recordkeeping.

6. All employees of contracted firms utilized in asbestos inspection activities shall conform fully to the requirements of this Operations and Maintenance Plan.

C. Building Inspection Program Overview: Asbestos Containing Building Materials (ACBM) are common throughout both VCU campuses. Commonly, ACBM is present in fireproofing, acoustical and decorative ceiling and wall plasters, thermal pipe, tank insulation and other mechanical insulation materials. ACBM may also be present in other materials such as plaster walls, ceiling and floor tiles, glues and mastics, roof felts, insulating chemical hoods, lab tops, oven gaskets, and other miscellaneous materials. Because of the significant amount of asbestos (both friable and non-friable) within VCU buildings, it is imperative that a well documented program for identifying ACBM, notifying building occupants of its presence and location, and developing procedures to minimize disturbance of asbestos and possible exposure be implemented. This section describes the VCU program for identifying and characterizing the condition of asbestos in buildings.

1. System-wide Surveys for Friable ACBM: To date, a single "university-wide" asbestos survey has been conducted at VCU: the Hall-Kimbrell asbestos assessment circa 1987. Although intended to assess asbestos-containing materials in all university and hospital buildings, several building areas were either omitted or inadequately surveyed during the undertaking. The documentation methods, sampling scope (several suspect materials were not included), and methods for determining quantification of asbestos-containing material is typically lacking in sufficient detail making the report of limited value for asbestos management purposes. The Hall-Kimbrell survey, due to its immense size, is available only in paper form. To arrange access to the Hall-Kimbrell survey, contact the Asbestos Inspector. The limited scope of the Hall-Kimbrell survey included:

a. Identification of all suspected friable asbestos containing building materials (ACBM).

b. Sampling of all suspect materials and conducting analysis utilizing Phase Light Microscopy (PLM).

c. Characterization of the condition of ACBM based upon a modified EPA (Sawyer) algorithm developed by the consultants.

d. Assigning of hazard ranking categories and numbers to each sample location that tested positive for asbestos.

e. Development of abatement cost estimates for all asbestos locations.

f. Exclusion of some friable materials (hard plasters, wall board) and several non-friable materials such as plaster walls, vinyl asbestos floor tiles/mastic, acoustical ceiling tiles/mastic, transite materials, roofing flashing/felts and an array of other suspect materials.

2. Campus Survey and Inspection Program

a. Periodic Surveillance of Friable ACBM: In order to prevent exposure of building occupants to asbestos fibers, periodic surveillance of known locations of friable ACBM with significant potential for exposure is performed. Periodic surveillance allows for an evaluation of the condition of the asbestos to determine if deterioration has occurred. If deterioration has occurred which increases the potential for asbestos exposure asbestos, the following steps will be taken by OEHS:

i. Contact/notify the impacted departmental supervisor(s), and VCU (Physical Plant) maintenance zone manager and inform of the situation.

ii. Recommend response actions for protecting university staff from potential asbestos hazards and for restoring a safe working environment.

iii. Conduct air monitoring to determine degree of exposure hazard posed to university staff.

iv. Provide instruction and support to Physical Plant to allow VCU Asbestos Abatement Team or asbestos abatement contractor to conduct required abatement actions.

b. Survey: The most proactive approach to identifying all ACBM within VCU buildings would involve conducting a comprehensive inspection of all campus structures. At the present time sufficient funds and resources are not available for completing this task. In lieu of a comprehensive survey of non-friable asbestos containing building materials, VCU has implemented a program requiring complete asbestos inspections of all areas prior to conducting construction activities (includes all renovation or demolition projects) or maintenance work with potential for disturbing asbestos-containing materials. The following procedures shall be followed to achieve this objective:

i. Maintain all data from previous asbestos inspections in database. When a work order is generated, the database shall be reviewed to determine if an adequate asbestos inspection has been conducted within the affected area.

ii. If a complete inspection is on file, the following measures shall be taken:

- If the inspection report indicates that the construction activity does not pose a potential for disturbance of asbestos-containing materials, proposed work may proceed.

- If the inspection reports indicates that asbestos-containing materials may be disturbed by construction activities abatement of the asbestos hazards must be conducted prior to proceeding with the proposed project.

iii. If incomplete data exists for the affected area, OEHS shall require that a complete asbestos inspection be conducted prior to beginning construction.

iv. The asbestos database shall be updated following the completion of each asbestos inspection.

D. Bulk Material Sampling and Analytical Requirements

1. Bulk Sample Collection: All sampling of asbestos-containing building materials must comply with Title 40, Part 763 of the Code of Federal Regulations and/or the publication EPA 560/5-85-030a, Asbestos in Buildings, Simplified Sampling Scheme for Friable Surfacing Materials. The following steps shall be followed when sampling suspect materials.

a. Secure the immediate area to prevent exposure to building occupants.

b. Wear a respirator (minimum protection: negative pressure, HEPA filter-equipped half mask) prior to taking sample.

c. Determine friability of materials to be sampled.

d. Wet the surface of the sample area with amended water.

e. Penetrate the suspected material completely with a sharp object such as a blade or core tube and remove a small section of the material.

i. If the material being sampled is non-homogeneous, a sample must be obtained from each non-homogeneous area for characterization of that area.

ii. If the material being sampled is layered, all layers must be sampled and analyzed separately.

f. Place the sample in a readily sealable plastic sample bag or other leak-proof, securable container, and seal it tightly.

g. Patch or repair the material where the sample was removed.

h. Label the bag and record the following information:

i. Sample number

ii. Date of sample

iii. Time of sample

iv. Building name or number

v. Room number

vi. Location in room

vii. Type of material sampled

viii. Inspector name

ix. Sample results (to be filled in after analysis)

i. The sample must be sent to a Virginia licensed, AIHA/NVLAP-approved asbestos analytical laboratory for analysis

j. Bulk samples shall be analyzed via Polarized Light Microscopy (PLM) via EPA Method 600 for quantification limits greater than 1% asbestos by weight. When deemed prudent by the Asbestos Inspector, PLM analyses showing "trace" amounts or low percentages of asbestos content may be further analyzed via EPA "Point Counting" method. Any decisions regarding a change in the regulatory status of suspect materials as a result of point counting or other confirmatory sampling methods shall be made entirely at the discretion of the university Asbestos Inspector.

E. Clearance Air Sampling: Following completion of an asbestos abatement action, except for glove bag, small scale-short duration, and other minimum impact maintenance activities, area clearance samples shall be collected and analyzed prior to release of the area for re-use. All clearance sampling and analysis shall use methods described in publication EPA 600/4-85-049, "Measuring Airborne Asbestos Following An Abatement Action." Phase Contrast Microscopy (PCM) via NIOSH 7400 may be used for analysis of clearance air samples, pending approval from OEHS. Where not specified all final air clearance within university buildings shall be conducted via transmission electron microscopy (TEM) per AHERA guidelines.

F. Quality Control (QC)

It is recommended that when multiple bulk or air samples are being collected that quality control measures be instituted to ensure the validity of the results. At all times the sampling and analytical guidelines specified by EPA methodology should be adhered to.

G. Documentation: When outside environmental firms are utilized for asbestos consulting services all inspection and air monitoring records shall be provided to the OEHS upon project completion. Provision of such asbestos information to OEHS shall be the responsibility of the construction manager, construction inspector, or other university staff member serving as the prime project contact/manager. The results of all inspections and air testing will be incorporated into the campus asbestos database.

IV. OPERATIONS & MAINTENANCE (O & M) ACTIVITIES

A. Periodic Surveillance and Air Monitoring:

1. Surveillance: OEHS conducts periodic surveillance within university structures that are considered to contain asbestos-containing building materials with significant potential for fiber release. The results of the surveillance events are reviewed along with database information to compile and update the Asbestos Hazard Description for VCU Buildings listing (Appendix B).

2. Air Monitoring: OEHS performs annual air monitoring within areas of five university facilities where spray-applied friable asbestos-containing materials are present: West Hospital, Lyons Dental Building, Founders Hall, and the Education Annex. The annual air monitoring within the A. D. Williams Clinic was discontinued in 2010 with the demolition of the structure. Several above-ceiling, inter-wall, and limited exposed areas within these structures contain varying amounts of friable spray-applied asbestos-containing fire proofing materials. Although most of the asbestos-containing fireproofing materials are enclosed behind physical barriers (i.e. suspended ceilings, plaster/ masonry /block walls, steel access panels) the monitoring is conducted to ensure the barriers affectively prevent migration of asbestos fibers into occupied building areas. Primary analysis of air samples is conducted by Phase Contrast Microscopy (PCM), additional testing via Transmission Electron Microscopy (TEM) may also be conducted when deemed necessary by the Asbestos Inspector. The sample results are carefully reviewed by OEHS and maintained in the VCU Asbestos Database. In the event that fiber concentrations exceed EPA recommended levels for occupied buildings, OEHS would take immediate action to ensure staff are evacuated from affected areas and that corrective measures are instituted as soon as possible. The annual O & M air monitoring results are posted in Appendix E.

B. O & M Repair and Cleanup Activities: OEHS works in conjunction with the VCU Asbestos Abatement Team (AAT) on the following O & M efforts:

1. Ongoing Repairs: The AAT performs limited, small scale-short duration repair and removal operations on thermal system insulation, surfacing materials, and other asbestos-containing materials serving to reduce potential exposure to university staff.

2. Emergency Cleanup Response: The AAT provides rapid response to asbestos emergencies reducing exposure potential and disruption of university operations.

3. Intensive O & M Services: The AAT conducts routine repair and cleanup operations within selected areas of the university where asbestos-containing thermal and mechanical insulation may be subject to occasional disturbance. These high maintenance areas include the extensive university steam tunnel system, the Sanger Hall B3 Mechanical Room, and the Sanger Hall 10th Floor Mechanical Room.

C. VCU Asbestos Program Database

1. OEHS maintains an extensive database which includes all information from university asbestos related activities since approximately 1987. Information contained within in the database includes:

a. Data from past asbestos inspections.

b. Air sampling data and project monitoring notes from past asbestos abatement projects.

c. OEHS-created asbestos removal design and/or scope of work documents.

d. Reports from past incidents involving asbestos-containing materials.

e. Air monitoring and surveillance data from past and ongoing O & M programs.

2. Database Access. A summary of current asbestos conditions within university buildings per the information compiled within the database is provided within Appendix B (this section is currently under construction, completion of structures with the greatest perceived asbestos hazards will be prioritized). Access to the complete database may be arranged through contacting the Asbestos Inspector.

V. NOTIFICATION

A. Notification must be provided to OEHS whenever:

1. Proposed construction (renovation/demolition) projects have the potential to disturb ACM.

2. Maintenance activities have the potential to disturb ACM.

3. Significant changes to the scope of construction projects affecting buildings/areas with ACBM are proposed.

4. New or nonroutine maintenance or other activities are proposed which may potentially disturb ACM.

B. Notification Specifics:

1. The OEHS Notification must be provided in writing (via electronic mail and/or campus mail system) and must include the following information:

a. Project location.

b. Project description.

c. Description of work practice procedures.

d. Proposed project time frame.

e. Project departmental contact(s).

2. Proposed projects may not begin until OEHS has reviewed the notification and verified that all measures required for meeting compliance with applicable federal, state and university standards have been satisfied.

3. A standard form which addresses all elements required for OEHS notification has been included in Appendix C of this document.

C. Notification of Asbestos Abatement to Building Occupants

1. Construction Management is responsible for informing all staff housed within buildings scheduled to undergo asbestos abatement prior to project mobilization. Ample lead time must be given to the department to inform staff of the event and to transfer personnel and equipment to temporary facilities away from the controlled area.

2. Individual university departments shall be responsible (in accordance with state regulations) for notifying staff within structures where construction activities with the potential for the disturbance of ACM are proposed.

3. The building occupant notification shall provide information regarding the nature of the work to be performed, asbestos-containing materials which may be disturbed, control measures to be taken to limit fiber release, and the degree of project monitoring to be performed to ensure their safety throughout the project.

4. The notification of building occupants shall either be provided through a written memo addressed to all affected staff or through the conducting of an educational seminar.

5. Upon request, OEHS will assist departments in the preparation and presentation of asbestos awareness seminar sessions.

D. Notification of Workplace Asbestos Hazards:

1. University Asbestos Management Plan

a. The Virginia General Assembly has mandated that asbestos management plans (per AHERA guidelines) be developed for all public buildings. In accordance with AHERA criteria, a properly developed and implemented management plan requires building owners to provide and maintain a written document which informs employees of the known or presumed presence of asbestos in campus buildings (this document is currently under construction and may be viewed in Appendix C of this text – if specific information for you building or location is not provided contact the Asbestos Inspector for assistance). This document must include locations of ACBM, information of the health risks associated with asbestos, procedures to prevent disturbance of ACBM and exposure, and locations where employees can access additional information regarding surveys, bulk sampling, and air monitoring results performed in any of the buildings.

b. Asbestos database information not provided within the university management plan is available for employee review at OEHS – Biological/Asbestos Safety Office located within Suite 109, 1000 E. Marshall St.(VMI Building). For access to asbestos database information contact the Asbestos Inspector.

c. In addition to this university management plan, OEHS also maintains an annually updated Asbestos Information Webpage that details basic elements of asbestos hazard management.

2. Signage:

a. OEHS posts signage at the entrances to any work areas perceived to have the potential for presenting asbestos-related health threats to university personnel. This signage communicates the university policy that access to all areas

known to present immediate asbestos-related health threats is restricted to properly trained and protected personnel.

b. OEHS applies warning labels on thermal and mechanical insulations which are known to be asbestos containing to prevent inadvertent disturbance and potential fiber release.

c. OEHS ensures that proper warning signage (per state and federal regulations) is posted (by abatement contractors) within areas undergoing active asbestos abatement.

VI. EMERGENCY PROCEDURES

A. Reporting Procedures: University staff members should report asbestos related incidents as follows:

1. Notify supervisor of the perceived hazard, and contact OEHS emergency line: 828-9834.

2. **Do not attempt to respond to the asbestos hazard yourself** – leave the immediate area and wait for instruction from OEHS.

B. Emergency Preparations: Supervisors are responsible for assuring that staff are familiar with workplace hazards and familiarized with emergency response procedures. OEHS strongly advises that supervisors take the following actions:

1. Determine where health and safety hazards including (but not limited to) asbestos are present within work areas.

a. Review Appendix B to determine where asbestos-containing materials are known to be present.

b. If your building has not yet been detailed in Appendix B, contact the Asbestos Inspector (telephone: 827-0348) for assistance.

2. Ensure that staff members are adequately trained for the potential workplace health and safety hazards including (but not limited to).

1. Refer to Section VIII for assistance in determining staff training requirements.

2. Contact OEHS at 828-1392 to arrange for asbestos awareness training.

C. Other Resources: Visit the OEHS - CBSS Website for assistance with chemical, fire, radiation, and occupational safety issues.

VII. ASBESTOS ABATEMENT REQUIREMENTS/PROCEDURES

A. Applicability: The following requirements apply to all university buildings unless identified in Appendix B as an asbestos-free structure.

B. Notification: Assurance that the notifications indicated below are provided shall be the responsibility of the project manager (Facilities Management representative).

1. OEHS Notification:

a. All renovation, demolition, and maintenance projects with the potential for disturbing asbestos-containing materials must involve OEHS during the planning stages. Failure to involve OEHS could result in project delays, unnecessary health risk to staff, and possible regulatory action.

b. OEHS must be notified 48 hours in advance of beginning any asbestos abatement project.

2. Regulatory Agencies: In the event that an asbestos project will involve the removal of 260 linear feet, 160 square feet, or 35 cubic feet of regulated asbestos containing materials (RACM), as defined in 40 CFR 61.141, notification to the Virginia Department of Labor and Industry – Division of Occupational Safety & Health (DLI) must be provided at least 20 working days prior to project commencement. Demolition affecting any structure (regardless of asbestos status) must be reported to the USEPA Region III (per 29 CFR 1926.1101) at least 10 working days prior to beginning the demolition.

3. Building Occupants: Written notification of the proposed asbestos abatement project must be provided to building occupants prior to beginning removal actions.

C. Abatement Design Requirements:

1. Asbestos Project Designs prepared internally (through OEHS) for university/hospital buildings will be developed by personnel possessing, at a minimum, a valid EPA Asbestos Project Designer Accreditation (per TSCA Title II 40 CFR 763, Subpart E, Appendix C). Asbestos removal project designs prepared by outside agencies (those other than OEHS) will require the services of an EPA accredited and Virginia-licensed Asbestos Project Designer.

2. Asbestos removal project designs prepared for abatement affecting university buildings/grounds shall, at a minimum, comply with the standards established by the university Model University Asbestos Abatement Specifications (Appendix D) including (but not limited to) provision of the following details:

a. Varieties and locations of asbestos-containing material involved (scope of work), including drawing(s) detailing specific locations and building details.

b. Detailed description of suitable work methods to be followed during abatement proceedings.

c. Identification of applicable federal and state asbestos and occupational safety regulations.

d. Contractor prework submittal requirements.

e. Method/criteria for final air clearance.

f. Other important project-specific information required for ensuring health and safety of abatement workers, staff, and the environment during abatement proceedings.

3. Asbestos removal project designs must specify abatement procedures which are as stringent as those specified in the Model University Asbestos Abatement Specifications (Appendix D).

D. Asbestos Removal Project Monitoring Requirements

1. In accordance with Virginia regulations (18 VAC 15-20-455.) all asbestos abatement projects involving the removal of over 260 linear ft, 160 ft^2, or 35 ft^3 of asbestos containing materials require the provision of an asbestos project monitor.

2. Internal (OEHS) staff serving as project monitors must, at a minimum, possess a valid EPA Asbestos Project Monitor Accreditation (per TSCA Title II 40 CFR 763, Subpart E, Appendix C) and will work under the direction of a Virginia-licensed project monitor (the Asbestos Inspector). All other entities serving as project monitors in university buildings/property shall possess a valid Virginia asbestos project monitor license.

3. Asbestos project monitors shall, at a minimum, perform the following duties:

a. Conduct daily inspections of contractor work methods and conditions within the work area and containment.

b. Maintain a daily log detailing:

i. Inspection findings/results.

ii. Air monitoring data.

iii. Type of work performed by contractor.

iv. Problems encountered and corrective measures employed.

c. Perform routine air monitoring, final visual clearance procedures, and final air clearance monitoring as specified in the asbestos removal project design.

4. Project monitors overseeing university asbestos projects shall be empowered to stop work whenever it is determined that a risk to staff, workers and/or the environment is present in relation to the job, or it is judged that work methods or conditions are in significant violation of governmental standards.

E. Requirements for Asbestos Contractors:

1. Contractors engaging in asbestos-related work activities within university buildings or grounds shall comply with all the requirements, procedures, standards and regulations established by the EPA, OSHA, DLI, VDEQ, DGS, VAC, and the Model University Asbestos Abatement Specifications.

2. All contractors shall maintain valid Virginia asbestos contractor and other licensure as specified in the Code of Virginia.

3. Asbestos contractors shall employ only Virginia-licensed workers and supervisors on all university asbestos projects.

4. Asbestos contractors shall utilize workers and supervisors who have been deemed physically fit for respirator use and asbestos work by a licensed physician for all university asbestos jobs.

5. Asbestos contractors shall be responsible for performing OSHA employee monitoring requirements per 29 CFR 1926.1101.

6. A complete list of university asbestos contractor requirements can be viewed in Appendix D (university model specifications).

VIII. Medical Surveillance

A. Applicability: All staff and contracted personnel engaging in asbestos abatement activities within university owned or rented facilities shall be included within a comprehensive occupational health surveillance program in accordance with 29 CFR 1926.1101, 29 CFR 1910.1001 and any other applicable federal or state regulations.

B. Required Elements: The list of required elements provided below is intended to serve as a summary of the main components of a medical surveillance program, refer to OSHA for complete requirements.

1. Frequency: An examination must be given at the time of hire if the potential work exposure will potentially be at or above the permissible exposure limit (PEL) of 0.1 fibers/cc of air. The examination will be repeated annually thereafter and upon termination. The same requirements hold for employees assigned to wear any form of respiratory protection.

2. Medical History: Completion of a medical history questionnaire per all applicable governmental regulations, with specific emphasis on eliciting symptomatology of the upper and lower respiratory or the gastrointestinal system for disease.

3. Occupational History: Detailed work history to include past employment exposures.

4. Physical Examinations: Standard comprehensive medical examination.

5. Laboratory Procedures:

a. Radiology: Chest radiography (posterior-anterior chest x-ray, right and left anterior oblique views) to be interpreted by "B" reader* per OSHA classification scheme**.

b. Pulmonary Function Test: Must include forced vital capacity (FVC) and a forced expiratory volume at one second (FEV), and be performed by a certified pulmonary function technician.

c. Gastrointestinal Examination: For employees 40 years of age or older or with 10 years or more since the initial occupational exposure to asbestos, a rectal examination and stool guaiac test for occult blood shall be performed annually.

d. Education: The worker should be informed regarding the nature of asbestos-related diseases and the rationale for the medical surveillance program.

* A radiologist or other medical specialist in the interpretation of chest radiographs for pneumoconiosis, and who has been certified by examination.

** The classification scheme for the pneumoconiosis - International Labor Office/Cincinnati (ILO U/C)

IX. TRAINING REQUIREMENTS

A. Applicability: In accordance with OSHA Asbestos Standards the employer must develop a training program for all employees that engage in asbestos related work, are exposed to asbestos, or reasonably expected to be exposed to asbestos at or above the PEL. The PEL is currently defined by OSHA as 0.1 fibers per cubic centimeter of air as an eight-hour time weighted average. The university takes a proactive stance regarding asbestos awareness training, with training required for all staff that may contact or routinely work in close proximity to asbestos-containing materials.

B. University Training Requirements: One of the following levels of asbestos training is required for all university staff dependant on degree of exposure risk posed by assigned job duties:

1. Employees participating in asbestos abatement, repair, or testing activities or other tasks with high potential for exceeding the asbestos PEL (OSHA Class I, II, and III jobs). This would include members of the VCU Asbestos Abatement Team, contracted asbestos removal employees, OEHS asbestos management staff and employees of outside asbestos consulting firms. Employees participating in asbestos abatement activities shall be trained in accordance with OSHA standards, Virginia regulations, and as outlined in the EPA "Building Owners Guide to Operations and Maintenance Programs for Asbestos-Containing Materials" (Green Book"). Training elements include elements of Level 2 O & M Training and Level 3 abatement worker training (as specified in the "Green Book") and also require earning and maintaining EPA certification and appropriate Virginia state asbestos licensure.

2. "Asbestos Awareness" Training:

a. Employees who routinely work in the proximity of asbestos-containing materials with low risk of exposure at or above the PEL (OSHA Class IV jobs). Includes primarily members the housekeeping staff, VCU Physical Plant, VCU Computer Information Systems and VCUHS Plant Operations personnel who may contact or work in close proximity to asbestos–containing materials on a routine basis.

b. Training includes an initial 2-hour asbestos awareness course plus annual 2-hour refresher courses thereafter. Elements of this course correspond to the recommendations for Level 1 Awareness Training outlined in the EPA "Green Book".

c. An outline of the 2-hour asbestos training course can be viewed at the following link:

http://www.vcu.edu/oehs/chemical/asbestos.html

A schedule of annual Level 1 Asbestos Awareness Events is provided in Appendix F.

3. General staff with low risk of significant asbestos exposure. The great majority of university employees are not involved in activities which pose the potential for disturbance of asbestos-containing materials and related health threats. These employees receive a brief asbestos awareness session during safety orientation training upon initial hiring. Additional information regarding employee orientation safety training can be accessed at the following link:

http://www.vcu.edu/oehs/fire/fos.html

C. Respiratory Protection Program: The use of any respiratory equipment for any occupational task (protection against asbestos fibers, chemical fumes, biological aerosols etc.) by university staff must be preapproved by OEHS.

1. Basic elements of the respiratory protection plan which must be satisfied prior to respirator usage include:

a. Instruction and training in the purpose, sanitary care/maintenance, and limitations of the issued respiratory equipment.

b. Medical evaluation by a health care professional confirming fitness for respirator use.

c. Issuance of qualitative and quantitative fit-testing to determine proper size/model of respirator.

2. All respiratory equipment utilized in conjunction with asbestos-related work activities within university buildings shall be Mining Enforcement Safety & Health Administration (MSHA) or National Institute for Occupational Safety and Health (NIOSH) approved.

3. University personnel who are considering the use of respiratory equipment should contact OEHS at 828-1392, or visit the University Respiratory Protection Plan website.

IX. RECORDKEEPING

A. Overview: An integral part of an Asbestos Management Plan is a well organized record keeping system which accurately documents all plan activities. Records documenting inspection, sampling, air monitoring, training, disposal, medical records, abatement projects, respirator program, hazard communications program, or any other activity involving asbestos containing materials must be maintained. It is the responsibility of the university to establish a record keeping system that facilitates rapid retrieval of data involving asbestos. Requirements for record keeping are outlined in the EPA "Green Book" and within the following federal regulations:

- 29 CFR 1910.1001 (OSHA Asbestos Standard)

- 29 CFR 1910.20 (OSHA Medical Access Order)

- 29 CFR 1910.1200 OSHA Hazard Communication Standard

- 29 CFR 1926 (OSHA Construction Standard)

- 40 CFR 763 Subpart G (EPA Worker Protection Rule)

B. Recordkeeping Requirements/Responsibilities: The university will comply with the record keeping requirements of the federal guidelines and regulations listed above in regard to maintaining appropriate medical records, training records, air and bulk sample data, and test results of respirator fit tests.

1. Medical records must be maintained for 30 years beyond employment termination for all employees assigned to asbestos-related job tasks or otherwise exposed to asbestos while performing job duties.

a. University employees assigned to perform asbestos related tasks include staff of the OEHS and the AAT: both entities will be responsible for maintaining their own medical records.

b. University employees not assigned to asbestos-related tasks but working in close proximity to asbestos-containing materials (OSHA “Class IV” Work Activities”) including maintenance staff and housekeepers may be at risk of inadvertent asbestos exposure. Maintaining medical records for exposure incidents affecting such personnel shall be the responsibility of the employee’s immediate supervisor.

2. Training records shall be maintained for one (1) year beyond employment.

a. OEHS and the AAT shall maintain asbestos training records for their respective staff members.

b. Records of 2 Hour Asbestos Awareness Training shall be maintained by each affected entity (maintained by each maintenance zone or department).

c. Maintaining of employee orientation training records shall be the responsibility of the employee's immediate supervisor.

3. Respirator fit test data shall be maintained for three (3) years beyond employment: OEHS and AAT will be responsible for maintaining records for their own staff.

4. Building inspection reports, project monitoring records, air monitoring and bulk sample analytical data shall be maintained on file indefinitely within the university asbestos database.

5. Personal sampling data, waste manifests and other information pertinent to AAT in-house asbestos removal projects shall be maintained on file indefinitely with the Duval Building Asbestos Shop.

6. Prework contractor submittals packages will be maintained within the university asbestos database for a period of at least one year following project final clearance.

XI. ADMINISTRATION OF ASBESTOS CONTRACTS

A. Overview: Asbestos abatement projects may be initiated and funded through large university entities (i.e. Construction & Facilities Management, Capital Programs, Architectural Services) or may be executed at the departmental level. The common denominator for all asbestos abatement projects is that responsible parties must notify OEHS prior to beginning construction and comply with the other elements of this management plan. OEHS either provides direct asbestos consulting services or performs quality assurance (QA) oversight (when AAT or outside consulting firms are retained for asbestos management services) during all phases of asbestos abatement projects affecting university buildings.

B. Asbestos Contractor Requirements: All asbestos abatement projects (except those which are performed by the AAT) must be executed by firms which are included on the university pre-qualified asbestos abatement contractor list, or by subcontracted firms that meet the following requirements:

1. Proof of valid Virginia Class A Contractor License and valid Virginia Asbestos Contractor License.

2. $1,000,000.00 General Liability Insurance.

3. $500,000.00 Vehicle Liability Insurance.

4. $1,000,000.00 Environmental Impairment Liability Insurance covering asbestos related work

5. Workers Compensation Insurance (statutory requirements and benefits) including Employers Liability coverage at not less than $100,000.00.

6. A minimum of 5 references where similar services were provided (at least one project listed must exceed $100,000.00).

7. A signed statement by President or Principal of company containing the following information:

a. A record of any citations issued by Federal, State, or Local regulatory agencies relating to asbestos abatement activity, including projects, dates, and resolutions.

b. A list of penalties incurred through noncompliance with asbestos abatement project specifications including liquidated damages, overruns in scheduled time limitations, and resolutions.

c. Situations in which an asbestos related contract has been terminated, including projects, dates, and reasons for termination.

d. A listing of any asbestos related legal proceedings/claims in which the contractor has participated or is currently involved, including descriptions of role, issue, and resolution.

e. Certification of a minimum of 5 years firm experience in asbestos abatement work.

f. Statements of financial solvency.

8. For more complete pre-qualification requirements contact the Office of Procurement and payment at 828-7837.

C. Pre-Abatement Requirements:

1. Asbestos Inspection: Prior to undertaking any demolition, renovation, or other activity which has the potential for disturbing ACBM an asbestos inspection which meets the standards of the EPA, OSHA, and other federal and state regulatory requirements shall be conducted by properly licensed personnel (per Section VII).

2. Asbestos Removal Project Design: In accordance with regulatory requirements, all asbestos jobs affecting greater than 10 sq. ft. of ACBM shall require the development of a project design. General elements and requirements for a project design are outlined in Section VII and discussed in detail within Appendix D.

3. Asbestos Project Monitor: In accordance with Virginia state requirements: All asbestos projects affecting greater than 160 ft^2, 260 linear ft., or 10 ft^3 of ACBM shall require the presence of a licensed project monitor. General duties and licensure requirements for project monitors are outlined in Section VII and discussed in detail within Appendix D.

4. Pre-project Meetings: Mandatory pre-project meetings are discussed in detail within Appendix D. An abbreviated list and description of pre-project meetings is provided below:

a. Prebid Meeting: Successful bidding contractors are required to attend a prebid meeting and walk-through that identifies project scope and special conditions.

b. Preconstruction Meeting. Prior to beginning abatement activities key contractor (project supervisor and/or superintendent) and university personnel including, but not limited the Construction Manager/Construction Inspector or other designated Facilities Management representative, University Housing and/or contract construction management representative, and Project Monitor) shall participate in an onsite meeting which addresses abatement procedures, containment construction, health & safety issues, and other concerns which are specific to the project.

5. Contractor Submittals: Prior to work start-up, successful bidders must provide a pre-work submittals package which details the following:

a. Contractors respiratory protection program.

b. Material Safety Data Sheets.

c. Verification that all contractor employees that will be involved in the project have had asbestos training and a medical examination in compliance with 29 CFR 1926.1101 and other applicable governmental standards.

d. Documentation verifying that the contractor has obtained approval from the disposal facility to accept the asbestos waste generated from the project.

e. Identity and licensure/training information for contractor air monitoring supervisor.

f. Other items as indicated in the university model asbestos removal specifications (Appendix D).

6. Assurance that electrical and HVAC systems, and other critical building systems are shut down, locked down, and tagged out, or suitably modified prior to proceeding with asbestos abatement is the responsibility of the Construction (Project) Manager. Construction manager shall not allow work to proceed until institution of suitable measures has been assured.

D. Abatement Management: The university shall ensure that the following criteria are satisfied:

1. A licensed project monitor shall oversee all asbestos removal activities on all projects meeting criteria indicated in Section XI.C.3. Project monitor duties shall include:

a. Implementing the conditions set forth in the project design.

b. Monitoring and recording daily work activities.

c. Identifying potential health & safety threats to workers, university staff, and the environment and developing corrective measures.

d. Issuing of a stop work order whenever:

i. An immediate threat to workers, university staff, and/or the environment is identified.

ii. Contractors fail to take steps necessary to comply with applicable governmental regulations and/or fail to adequately address health and safety concerns.

e. Conducting final visual and air clearance as specified in the project design.

2. Asbestos removal contractors and the AAT shall be responsible for conducting their own OSHA personal air monitoring as specified in the OSHA Asbestos Standard.

3. Construction Management shall ensure that areas affected by asbestos abatement are not reoccupied until final clearance has been granted by the project monitor.

E. Post-Abatement Management

1. Asbestos Waste Manifests:

a. Construction (project) managers shall ensure that waste manifests are received for all asbestos waste generated on renovation, demolition, or other contracted projects affecting university buildings. Construction managers shall retain a copy of the asbestos waste manifests within their contract documentation project files – and provide a copy to OEHS (fax 828-6169, attention: David Patterson) for inclusion in the university asbestos database.

b. Asbestos Abatement Team: The AAT shall retain copies of waste manifests and provide copies to OEHS for asbestos removed during all in-house projects.

2. Contractor Air Monitoring Results:

a. Construction Managers shall forward copies of all contractor personal air monitoring data to OEHS as soon as possible following project completion.

b. Asbestos Abatement Team: The AAT shall retain all records of personal asbestos exposure air monitoring collected during asbestos jobs for at least 30 years following employees last day of employment.

APPENDIX A

GLOSSARY OF TERMS

ABIH: American Board of Industrial Hygiene

ACBM: Asbestos-containing building material. Means surfacing ACM, thermal system insulation ACM, or miscellaneous ACM that is found in or on interior structural members or other parts of a school building.

Accessible: when referring to ACM, the material is subject to disturbance by school building occupants or custodial or maintenance personnel in the course of their normal activities.

ACM: Asbestos-containing material(s)

Acoustical Insulation: The general application or use of asbestos for the control of sound due to its lack of reverberant surfaces.

Acoustical Tile: A finishing material in a building usually found in the ceiling or walls for the purpose of noise control.

Adequately Wet: Sufficiently mix or penetrate with liquid to prevent the release of particulates. If visible emissions are observed coming from asbestos-containing material, then that material has not been adequately wet.

Aggressive Sampling: Air sampling which takes place after final clean up while the air is being physically agitated to produce a "worst case" situation.

AHERA: Asbestos Hazard Emergency Reauthorization Act.

AIHA: American Industrial Hygiene Association

AIHA Accredited Laboratory: A certification given by the AIHA to an analytical laboratory that has successfully participated in the "Proficiency Analytical Testing" program for quality control as established by the National Institute for Occupational Safety and Health. Airborne Asbestos Analysis: Determination of the amount of asbestos fibers suspended in a given amount of air.

Air Diffuser: A device designed to disperse an air stream throughout a given area.

Air Erosion: The passage of air over friable ACBM which may result in the release of asbestos fibers.

Air Lock: A system of enclosures consisting of two polyethylene curtained doorways at least three feet apart that does not permit air movement between clean and contaminated areas.

Air Monitoring: The process of measuring the airborne fiber concentration of a specific quantity of air over a given amount of time.

Air Plenum: Any space used to convey air in a building or structure. The space above a suspended ceiling is often used as an air plenum.

Algorithm: A universally accepted procedure developed for the purpose of solving a particular problem. Algorithms developed for asbestos provide a numerical index for evaluating a degree of hazard in a particular area. The Sawyer Algorithm and the Ferris Index are two examples, but neither are widely used today.

Alveoli: Located in clusters around the respiratory bronchi of the lungs, this is the area in which true respiration takes place.

Ambient Air: The surrounding air or atmosphere in a given area under normal conditions.

Amended Water: Water to which a chemical wetting agent (surfactant) has been added to improve penetration into asbestos-containing materials that are being removed.

Amosite: An asbestiform mineral of the amphibole group containing approximately 50% silicon and 40% iron (II) oxide, and is made up of straight, brittle fibers, light gray to pale brown in color.
amphibole: One of the two major groups of minerals from which the asbestiform minerals are derived, distinguished by their chain-like crystal structure and chemical composition.

ANSI: American National Standards Institute

Approved Landfill: A site for the disposal of asbestos-containing waste that has been given EPA and VDEQ approval.

Asbestiform Minerals: Minerals which, due to their crystal structures and chemical composition, tend to be separated into fibers and can be classified as a form of asbestos.

Aspect Ratio: The length of a fiber vs. its width.

Asbestos: Any of the following asbestiform minerals alone or in combination: chrysotile, amosite, crocidolite, tremolite, anthophyllite, actinolite, and any of these minerals that have been chemically treated and/or altered.

Asbestos Abatement: Procedures to control fiber release from asbestos-containing materials in buildings.

Asbestos Abatement Project Design: A set of guidelines developed by an EPA certified project designer, that a contractor must follow when conducting an asbestos abatement job.

Asbestos (Environmental) Consultant: Any person who contracts to provide professional health and safety services relating to asbestos-containing construction materials. The activities of an asbestos consultant include building inspection, abatement project design, contract administration, sample collection, preparation of asbestos management plans, clearance monitoring, and supervision of project monitor(s).

Asbestos-Containing Waste Materials: Includes filters from control devices, friable asbestos waste material, and bags or other similar packaging contaminated with commercial asbestos. As applied to demolition and renovation operations, this term also includes regulated asbestos-containing material waste and materials contaminated with asbestos including disposable equipment and clothing.

Asbestos Debris: Pieces of ACBM that can be identified by color, texture, or composition, or means dust, if the dust is determined by an accredited inspector to be ACM.

Asbestos Exposure Assessment: Determining the extent of the asbestos hazard that exists in a building in order to develop corrective actions.

Asbestos Fibers: Fibers with their length being greater than five microns (length to width ratio of 3:1), generated from an asbestos-containing material.

Asbestosis: A non-malignant, progressive, irreversible lung disease caused by the inhalation of asbestos dust and characterized by diffuse fibrosis.

Asbestos-related Work (Job): Any activity which by disturbing asbestos-containing construction materials may release asbestos fibers into the air.

Asbestos Standard: Reference to the OSHA requirements in the general industry standards regarding asbestos exposure (29 CFR 1910.1001), and EPA National Emission Standard for Hazardous Air Pollutants (NESHAP) (40 CFR 61, subpart M).

Atmospheres Immediately Dangerous to Life or Health (ADLH): A hazardous atmosphere to which exposure will result in serious injury or death in a matter of minutes, or cause serious delayed effects.

Authorized Person: Any person authorized by the employer and required by work duties to be present in regulated areas.

Bridging Encapsulant: The application of a sealant over the surface of asbestos-containing material to prevent the release of asbestos fibers.

Bronchi: Primary branches of the trachea (windpipe).

Category I Asbestos-Containing Material (ACM): Asbestos-containing packing, gaskets, resilient floor covering, and asphalt roofing products containing more than 1 percent asbestos as determined using the method specified in appendix A, subpart F, 40 CFR part 763, section 1, Polarized Light Microscopy.

Category II ACM: Any material, excluding Category I ACM, containing more than 1 percent asbestos as determined by using the methods specified in appendix A, subpart F, 40 CFR part 763, section 1, Polarized Light Microscopy that when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure.

Cementitious: Asbestos-containing materials that are densely packed, granular and are friable.

Certified Asbestos Consultant: Any asbestos consultant with adequate EPA certification and Virginia licensure pursuant to this management plan and the Virginia Asbestos Codes.

Certified (Licensed Asbestos Abatement) Supervisor: An individual who is capable of identifying asbestos hazards in the workplace and who has sufficient experience and authority to take prompt corrective measures to eliminate them. The certified supervisor must possess valid EPA accreditation and a Virginia Asbestos Abatement Supervisor License and must be on the job site at all times during contractor work hours.

CFM: Cubic feet per minute

Chrysotile (White Asbestos): The only asbestiform mineral of the serpentine group which contains approximately 40% each of silica and magnesium oxide. It is the most common form of asbestos used in buildings.

CIH: An industrial hygienist who has been granted certification by the American Board of Industrial Hygiene.

Cilia: Tiny hair-like structures in the windpipe and bronchi of the lung passages that help force undesirable particles and liquids up and out of the lungs.

Clean Area: The first stage of the decontamination enclosure system in which workers prepare to enter the work area.

Commercial Asbestos: Any material containing asbestos that is extracted from ore and has value because of its asbestos content.

Construction (Project) Manager: Facilities Management, University Housing, VCU Construction, or other university staff member designated to administer university

construction, demolition, renovation, and/or maintenance activities with potential for disturbing asbestos-containing materials.

Contaminated Items: Any objects that have been exposed to airborne asbestos fibers without being sealed off or isolated.

Contract Specifications (Asbestos Abatement Project Design): A set of guidelines that a contractor must follow when conducting an asbestos abatement job.

Cutting: Penetrating with a sharp-edged instrument and includes sawing, but does not include shearing, slicing, or punching.

Decontamination: A series of connected rooms with polyethylene enclosure system curtained doorways for the purpose of preventing contamination of areas adjacent to the work area.

Decontamination Area: An enclosed area adjacent and connected to the regulated area and consisting of an equipment room, shower area, and clean room, which is used for the decontamination of workers, materials, and equipment contaminated with asbestos.

Delaminate: To separate into layers. As used here, to separate from the substrate.

Demolition: The wrecking or taking out of any load-supporting structural member and any related razing, removing, or stripping of asbestos products.

Dirty Area: Any area in which the concentration of airborne asbestos fibers exceeds or is likely to exceed 0.01 f/cc, or where there is visible asbestos residue.

Dispersion Staining: Used in conjunction with polarized light to identify bulk samples. A particle (fiber) identification technique based on difference between light dispersion of a particle (fiber), and liquid medium in which it is immersed.

Duct Tape: Heavy gauge tape capable of sealing joints or adjacent sheets of polyethylene.

Dust Mask: Single use or disposable dust respirator with a low protection factor, not suitable for protection against asbestos fibers.

Electron Microscopy: A method of asbestos sample analysis which utilizes an electron beam to differentiate between fibers.

Emergency Renovation Operation: A renovation operation that was not planned but results from a sudden, unexpected event that, if not immediately attended to, presents a safety or public health hazard, is necessary to protect equipment from damage, or is necessary to avoid imposing an unreasonable financial burden. This term includes operations necessitated by non-routine failures of equipment.

Employee Exposure: Exposure to airborne asbestos that would occur if the employee were not using suitable respiratory protective equipment. Whenever the term exposure is used in this section it refers to exposure of employees.

Employee Notification: Informing employees or building occupants if asbestos is present in the building, also informing them of the hazards associated with asbestos exposure, what is being done to eliminate the problem, etc.

Employer's Liability: Legal responsibility imposed on an employer requiring him/her to pay damages to an injured employee.

Encapsulant (sealant): A substance applied to asbestos-containing material which controls the release of airborne asbestos-fibers.

Encapsulation: The treatment of ACBM with a material that surrounds or embeds asbestos fibers in an adhesive matrix to prevent the release of fibers, as the encapsulant creates a membrane over the surface (bridging encapsulant) or penetrates the material and binds its components together (penetrating encapsulant).

Enclosure: An airtight, impermeable, permanent barrier around ACBM to prevent the release of asbestos fibers into the air.

EPA: Environmental Protection Agency

EPA Regulations: Regulatory standards that cover emissions into the outside environment from a workplace and disposal of hazardous wastes from job sites.

Equipment Room (Change Room): A contaminated room located within the decontamination area that is supplied with impermeable bags or containers for the disposal of contaminated protective clothing and equipment. Fabricating: Any processing (e.g. cutting, sawing, drilling) of a manufactured product that contains commercial asbestos, with the exception of processing at temporary sites (field fabricating) for the construction or restoration of facilities. In the case of friction products, fabricating includes bonding, debonding, grinding, sawing, drilling, or other similar operations performed as part of fabricating.

Facepiece: The portion of a respirator which covers the wearer's nose, mouth, and eyes in a full facepiece.

f/cc: Fibers per cubic centimeters of air.

Fiber: A particulate form of asbestos, 5 micrometers or longer, with a length-to-diameter ratio of at least 3 to 1.

Fiber Release Episode: Any uncontrolled or unintentional disturbance of ACBM resulting in visible emission.

Fibrous: Composed almost entirely of fibers.

Fibrous Aerosol Monitor (FAM): A portable survey instrument with the capability of providing instantaneous airborne fiber concentration readings.

Fireproofing: Spray-on or trowel-applied fir resistant materials utilized to attain a desired fire rating.

Friable: When referring to material in a school building means that the material, when dry, may be crumbled, pulverized, or reduced to powder by hand pressure, and includes previously material after such previously material becomes damaged to the extent that when dry it may be crumbled, pulverized, or reduced to powder by hand pressure.

Friable Asbestos: Any material containing more that 1 percent asbestos as determined using the method specified in appendix A, subpart F, 40 CFR part 763 section 1, Polarized Light Microscopy, that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure.

Fugitive Source: Any source of emissions not controlled by an air pollution control device.

Full Facepiece Respirator: A respirator that covers the wearer's entire face from the hairline to below the chin.

Functional Space: A room, group of rooms, or homogeneous area (including crawl spaces or the space between a dropped ceiling and the floor or roof deck above), such as classroom(s), a cafeteria, gymnasium, hallway(s), designated by a person accredited to prepare management plans, design abatement projects, or conduct response actions.

Glove bag: A manufactured or fabricated device consisting of a bag constructed of a minimum thickness of 6 mil plastic or other impervious material, two inward-projecting long-sleeve gloves impervious to asbestos fibers, one inward-projecting water-wand sleeve, and an attached, labeled receptacle for asbestos waste. The glove bag is constructed and installed in such a manner that it surrounds the object or area to be decontaminated and contains the asbestos fibers released during the removal process under negative pressure. The glove bag may be modified to accommodate other tools and work practices as long as it remains sealed.

Glove-box (bag): Plastic enclosure placed around a specific operation such as a valve to contain small areas of materials for asbestos removal.

Grinding: To reduce to powder or small fragments and includes mechanical chipping or drilling.

Ground Fault Circuit Interrupter: A circuit breaker that is sensitive to very low levels of current leakage from a fault in an electrical system.

Ground Fault Interrupter: A device which automatically de-energizes any high voltage system component which has developed a fault in the ground line.

Half Mask Respirator: A respirator which covers one-half of the wearer's face and is equipped with filter capable of screening out 99.97% of all particles larger than 0.3 microns.

Heat Stress: A bodily disorder associated with exposure to excessive heat.

HEPA: High Efficiency Particulate Air (Air Filter). A filter capable of trapping and retaining at least 99.97 percent of all monodispersed particles of 0.3 micrometers in diameter or larger.

HEPA Filtered Vacuum: A high efficiency particulate air (HEPA) filtered vacuum capable of trapping and retaining 99.97% of all particulates larger than 0.3 microns.

Homogenous: Evenly mixed and similar in appearance and texture throughout.

Homogeneous Area: An area of surfacing material, thermal system insulation material, or miscellaneous material that is uniform in color and texture.

HVAC System: Heating, Ventilation, and Air Conditioning system usually found in large business and industry facilities.

Industrial Hygienist: A professional qualified by education, training, and experience to recognize, evaluate, and develop controls for occupational health hazards.

Leak-tight: Solids or liquids cannot escape or spill out. It also means dust-tight.

Local Education Agency (LEA): Means: (1) Any local educational agency as defined in section 198 of the Elementary and Secondary Education Act of 1965 (20 U.S.C. 3381). (2) The owner of any nonpublic, nonprofit elementary, or secondary school building. (3) The governing authority of any school operated under the defense dependents' education system provided for under the Defense Dependents' Education Act of 1978 (20 U.S.C. 921, et seq.).

Local Exhaust Ventilation: The mechanical removal of air contaminants from a point of operation.

Lung Cancer: An uncontrolled growth of abnormal cells in the lungs which may result in the death of the host.

Make-up Air: Supplied or recirculated air to offset that which has already been exhausted from an area.

MCEF: Mixed Cellulose Ester Filter which is one of several different types of media used to collect asbestos air samples.

Medical Examinations: An evaluation of a person's health status conducted by a medical doctor.
Medical History: A record of a person's past health record, including all the hazardous materials that they have been exposed to and also any injuries or illnesses which might dictate their future health status.

Mesothelioma: A relatively rare form of cancer which develops in the lining of the pleura or peritoneum with no known cure.

Method 7400: NIOSH sampling and analytical method for fibers using phase-contrast microscopy. Replaces method P & CAM 239.

Micron: One millionth of a meter.

Mil: Prefix meaning one-thousandth.

Millimeter: One-thousandth of a meter.

Miscellaneous Material: Interior building material on structural components, structural members or fixtures, such as floor and ceiling tiles, and does not include surfacing material or thermal system insulation.

MSDS: Material Safety Data Sheet

Negative Pressure: An atmosphere created in a work area enclosure such that airborne fibers will tend to be drawn through the filtration system rather than leak out into the surrounding areas. The air pressure inside the work area is less than that outside the work area.

NESHAP: National Emission Standards for Hazardous Air Pollutants - EPA Regulation 40 CFR subpart M, part 61.

NIOSH: The National Institute for Occupational Safety and Health, established by the Occupational Safety and Health Act of 1970.

NIOSH/MSHA: The official approving agencies for respiratory protective equipment.

: Material which when dry may not be crumbled, pulverized, or reduced to powder by hand pressure.

Asbestos-Containing Material: Any material containing more that 1 percent asbestos as determined using the method specified in appendix A, subpart F, 40 CFR part 763m section 1, Polarized Light Microscopy, that, when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure.

Nonscheduled Renovation Operation: A renovation operation necessitated by the routine failure of equipment, which is expected to occur within a given period based on past operating experience, but for which an exact date cannot be predicted.

Numerical Value: Refers to the types and percentages of asbestos present in a given sample.

Operations and Maintenance Program (O & M): A program of work practices to maintain friable ACBM in good condition, ensure clean up of asbestos fibers previously released, and prevent further release by minimizing and controlling friable ACBM disturbance or damage.

OSHA: The Occupational Safety and Health Administration which was created by the Occupational Safety and Health Act of 1970; serves as the enforcement agency for safety and health in the workplace environment.

Outside Air: The air outside buildings and structures.

Owner or Operator of a Demolition or Renovation Activity: Any person who owns, leases, operates, controls, or supervises the facility being demolished or renovated or any person who owns, leases, operates, controls, or supervises the demolition or renovation operation, or both.

Particulate Asbestos Material: Finely divided particles of asbestos or material containing asbestos.

PAT Samples: Proficiency Analytical Testing of asbestos samples conducted through NIOSH for laboratories involved with the analysis of asbestos samples.

PCM: Phase Contrast Microscopy.

PEL: Permissible Exposure Limit as stated by OSHA.

Penetrating Encapsulant: Liquid material applied to asbestos-containing material to control airborne fiber release by penetrating into the material and binding its components together.

Peritoneum: The thin membrane that lines the surface of the abdominal cavity.

Permissible Exposure Limit (PEL): OSHA –mandated limits for employee exposure: 0.1 fibers/cc over 8-hour time weighted average (TWA) and no greater than 1.0 fibers/cc over any 30-minute period (excursion limit).

Personal Protective Equipment (PPE): Any material or device worn to protect a worker from exposure to, or contact with, any harmful material or force.

Personal Sample: An air sample taken with the sampling pump directly attached to the worker with the collecting filter placed in the worker's breathing zone.

Phase Contrast Microscopy (PCM): An optical microscopic technique used for the counting of fibers in air samples, but which does not distinguish fiber types.

Pipe Lagging: The insulation or wrapping around a pipe.

Planned Renovation Operations: A renovation operation, or a number of such operations, in which some RACM will be removed or stripped within a given period of time and that can be predicted. Individual nonscheduled operations are included if a number of such operations can be predicted to occur during a given period of time based on operating experience.

Pleura: The thin membranes surrounding the lungs which line the internal surface of the chest cavity.

Polarized Light Microscopy (PLM): An optical microscopic technique used to distinguish between different types of asbestos fibers by their shape and unique optical properties.

Polyethylene: Plastic sheeting which is often used to seal off an area in which asbestos removal is taking place for the purpose of preventing contamination of other areas.

Posting: Refers to caution or warning signs which should be posted in any area in which asbestos removal is taking place, or where airborne fiber levels may present a health hazard.

Potential Damage: Circumstances in which: (1) Friable ACBM is in an area regularly used by building occupants, including maintenance personnel, in the course of their normal activities. (2) There are indications that there is a reasonable likelihood that the material or its covering will become damaged, deteriorated, or delaminated due to factors such as changes in building use, changes in operations and maintenance practices, changes in occupancy, or recurrent damage.

Potential Significant Damage: Circumstances in which: (1) Friable ACBM is in an area regularly used by building occupants, including maintenance personnel, in the course of their normal activities. (2) There are indications that there is a reasonable likelihood that the material or its covering will become damaged, deteriorated, or delaminated due to factors such as changes in building use, changes in operations and maintenance practices, changes in occupancy, or recurrent damage. (3) The

material is subject to major or continuing disturbance, due to factors including, but not limited to accessibility or, under certain circumstances, vibration or air erosion.

Pre-Construction Conference: A meeting held before any work begins between the contractor and the building owner at which time the job specifications are discussed and final details of the work are clarified.

Pre-Employment Physical: Complete medical examination of an employee before the job begins to determine whether or not he/she is fit to perform the functions of their employment.

Preventive (Corrective) Measures: Actions taken to reduce disturbance of ACBM or other wise eliminate the reasonable likelihood of related exposure hazard.

Properly Trained/Protected Personnel: Competent individuals who possess a valid Virginia State Asbestos Worker License, are under a suitable (per OSHA requirements) medical surveillance program and utilize appropriate PPE per all applicable federal, state and university standards.

Protection factor: Degree of protection from asbestos fiber inhalation provided by the respirator, determined by dividing the airborne fiber concentration outside of the mask by the concentration inside the mask

Protective Clothing: Protective, lightweight garments worn by workers performing asbestos abatement to keep gross contamination off the body.

Pulmonary: Pertaining to, or affecting the lungs, or some portion thereof.

Pulmonary Function Tests: A part of the medical examination required to determine the health status of a person's lungs.

Qualitative Fit Test: A method of testing a respirator's face-to-facepiece seal by through the use of irritant smoke, saccharin or other distinct odor-producing products, while simulating working motions in order to provide the most affective fitting for the wearer.

Quantitative Fit Test: A method of testing a respirator's face-to-facepiece which yields the actual protection factor provided by the respirator.

Random Sample: A sample drawn in such a way that there is no set pattern and is designed to give a true representation of the entire population or area.

Record Keeping: Detailed documentation of all program activities, decisions, analyses, and any other pertinent information to a project.

Regulated Area: An area demarcated by the employer in order to establish where airborne concentrations of asbestos exceed, or can reasonably be expected to

exceed, the PEL and /or excursion limit. The regulated area may take the form of (1) a temporary enclosure, as required by subsection (e)(2) of this section, or (2) an area demarcated in any manner that minimizes the number of employees exposed to asbestos.

Regulated Asbestos-Containing Material (RACM): Means (a) Friable asbestos material, (b) Category I ACM that has become friable, (c) Category I ACM that will be or has been subjected to sanding, grinding, cutting, or abrading, or (d) Category II ACM that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder by the forces expected to act on the material in the course of demolition or renovation operations regulated by this subpart.

Reintrainment: The disturbance of fibers already separated from the main body so that they re-suspend into the atmosphere after having initially settled.

Removal: The taking out or stripping asbestos or materials containing asbestos.

Renovation: The modifying of any existing structure, or portion thereof, where exposure to airborne asbestos may result.

Repair: Any overhauling, rebuilding, reconstructing, or reconditioning of structures, or parts thereof, where asbestos is present.

Resilient Floor Covering: Asbestos-containing floor tile, including asphalt and vinyl floor tile, and sheet vinyl floor covering containing more than 1 percent asbestos as determined using polarized light microscopy according to the method specified in appendix A, subpart F, 40 CFR part 763, Section 1,

Resolution: The ability to distinguish between individual objects, as with a microscope.

Respirable: Breathable.

Respiratory Protection Program: An OSHA mandated written program established by an employer which provides for the safe use of respirators on their job sites.

Response Action: Methods and/or policies (including removal, encapsulation, enclosure, repair, or operations & maintenance) which protect humans from asbestos exposure.

Routine Maintenance Area: An area, such as a boiler room or mechanical room that is not normally frequented by students and in which maintenance employees or contract workers regularly conduct maintenance activities.

School: Any elementary or secondary school (K - 12).

School Building: Means: (1) Any structure suitable for use as a classroom, including a school facility such as a laboratory, library, school eating facility, or facility used for the preparation of food. (2) Any gymnasium or other facility which is specially designed for athletic or recreational activities for an academic course in physical education. (3) Any other facility used for the instruction or housing of students or for the administration of educational or research programs. (4) Any maintenance, storage, or utility facility, including any hallway, essential to the operation of any facility described in this definition of "school building" under paragraphs (1), (2), or (3). (5) Any portico or covered exterior hallway or walkway. (6) Any exterior portion of a mechanical system used to condition interior space.

Serpentine: One of the two major groups of minerals from which the asbestiform minerals are derived, distinguished by their tubular structure and chemical composition.

Shower Room: A room between the clean room and the equipment room in a worker decontamination system in which workers take showers when leaving the work area.

Significantly Damaged Friable Miscellaneous ACM: Damaged friable miscellaneous ACM where the damage is extensive and severe.

Significantly Damaged Friable Surfacing ACM: Damaged friable surfacing ACM in a functional space where the damage is extensive and severe.

Small-Scale, Short-Duration Activities: Operations for which a negative pressure enclosure is infeasible, impractical, or unsafe due to the small size of the task. Examples of these are tasks such as, but not limited to: removal of asbestos-containing insulation from short sections of pipes; removal of small quantities of asbestos-containing insulation on beams or above ceilings; replacement of an asbestos-containing gasket on a valve; installation or removal of small sections of drywall; roofing; other general building maintenance; and installation of electrical conduits through or proximate to asbestos-containing materials.

Spirometer: An instrument which measures the volume of air being expired from the lungs.

Structural Member: Any load-supporting member such as beams and load supporting walls of a facility.

Structural Member: Any load supporting member of a facility, such as beams and load supporting wall; or any nonload-supporting member, such as ceilings and nonload-supporting walls.

Substrate: The materials or existing surface located under or behind the asbestos-containing material.

Surfacing Material: Material that is sprayed-on, troweled-on, or otherwise applied to surfaces, such as acoustical plaster on ceilings and fireproofing materials on structural members, or other materials on surfaces for acoustical, fireproofing, or other purposes.

Surfactant: A chemical wetting agent added to water to improve its penetration abilities into asbestos-containing materials.

Suspect Material: Material with the potential for being asbestos containing: synonymous with "presumed asbestos-containing material" (PACM).

Thermal System Insulation: Material applied to pipes, fittings, boilers, breeching, tanks, ducts, or other interior structural components to prevent heat loss or gain, or water condensation, or for other purposes.

Transmission Electron Microscopy (TEM): A method of microscopic analysis which utilizes an electron beam that is focused onto a thin sample.

Tumor: A swelling or growth of cells and tissues in the body which does not serve a useful purpose.

TWA: Time Weighted Average, as in air sampling.

University Building: Any structure owned or leased by Virginia Commonwealth University or related entities (i.e. VCU Real Estate Foundation).

USEPA (EPA): United States Environmental Protection Agency

Vermiculite: A micaceous mineral that is sometimes used as a substitute for asbestos which is lightweight and highly water-absorbent.

Visible Emissions: Any release from asbestos-containing materials which is visible to the naked eye.

Visual Inspection: A thorough inspection of the work area performed to confirm completion of the scope of work and adequate clean up of a worksite prior to conducting final air clearance.

Waste Generator: Any owner or operator of a source covered by this subpart whose act or process produces asbestos-containing waste material.

Waste Shipment Record (Manifest): The shipping document, required to be originated and signed by the waste generator, used to track and substantiated the disposition of asbestos-containing waste material.

Water Damage: Deterioration or delamination of ceiling or wall materials due to leaks from plumbing or cracks in the roof.

Wet Cleaning (Wet Methods): The process of eliminating asbestos contamination from surfaces and objects by using cloths, mops, or other cleaning tools which have been dampened with water.

Wetting Agents: Materials that are added to water which is used for wetting the asbestos-containing material in order for the water to penetrate more effectively.

Worker's Compensation: A system of insurance required in some states by law, financed by employers, which provides payments to employees or their families for occupational injuries, illnesses, or fatalities resulting in loss of wage or income incurred while at work.

APPENDIX B

ASBESTOS HAZARD INDENTIFICATION LISTING:

VCU/MCVH BUILDING INVENTORIES

This listing is intended to assist staff in determining locations of asbestos-containing materials and related hazards within university buildings. The listing is currently under construction and has been partially completed for only a limited number of university structures. The information provided is based on the most current information available (latest revision date: October 11, 2012). This guide will be continually expanded until all university structures are included, and updated annually thereafter. If the building in question is not addressed in this listing, or if more specific information is required please contact the Asbestos Inspector via telephone at 827-0348, or via e-mail at: dpatters@vcu.edu. Where possible, titles and dates of past inspection reports have been provided to aid in locating desired file information within the asbestos database.

EAST (MEDICAL) CAMPUS

A.D. Williams Clinic

Building demolished in 2010. Full information regarding asbestos demolition survey, project design, project monitoring and building history is available in the VCU asbestos database within the A.D. Williams Clinic files dated 1985 - 2010. These files are maintained within the OEHS VMI Building Facility within the Suite 107 Laboratory "Decommissioned Building File Cabinet."

Alumni House

Insufficient information available, pending inspection/record review

Ambulatory Care Center (New)

Building erected in 1994. No asbestos-containing materials are known to be present throughout the structure, thus renovation and maintenance activities do not require prior OEHS notification.

Ambulatory Care Center (Old)

Building demolished as part of new Gateway Center Project. Full information regarding asbestos demolition survey, project design and project monitoring is available in the VCU asbestos database within the "Ambulatory Care Center" files dated 1994 - December 2000. These files are maintained within the OEHS VMI Building Facility within the Suite 107 Laboratory "Decommissioned Building File Cabinet."

Bear Hall

a. Friable Materials: Asbestos inspections conducted circa. 1997 ("MCV Low-Rise Dormitories, Renovation") indicates that the only friable materials present are mudded fittings on domestic and heating system piping. The levels of asbestos detected were from trace to very low concentrations, pipe fittings are sparse and generally in very good condition. Damaged fittings should be reported immediately to VCU Student Housing or OEHS if observed. Contact OEHS before conducting any maintenance or renovation activities which may damage or otherwise disturb the mudded fittings.

b. Materials:

i. Flooring: Past inspection has revealed that vinyl floor tile and associated mastic throughout the structure is asbestos containing.

ii. Exterior/Roofing Materials: Flashing materials on portions of the roof are known to be asbestos containing. Prior to disturbing any roofing, window caulking/

putty/glazing materials contact the VCU Student Housing office and OEHS for clearance.

Blackwell Smith Building

a. Friable Materials: No friable asbestos-containing materials are known to be present within the facility.

b. Non friable asbestos-containing materials:

- Floor tile mastic materials: throughout.

- Duct mastic.

- Laboratory fume hood casing materials.

- Sink backing materials: underside of sink basins, sporadic.

- Elevator doors (assumed).

- Mastic pucks holding black boards onto the walls.

- Fire doors; all door interiors should be considered asbestos containing until tested/cleared by OEHS.

- Roofing materials, flashing used to hold copper wire on the roof was determined to be asbestos-containing.

Bookstore, MCV Mail Services, and Childcare Facility ("N-Deck")

Building erected post 1989. No asbestos-containing materials are known to be present throughout the structure, thus renovation and maintenance activities do not require prior OEHS notification.

Cabaniss Hall:

a. Friable Materials:

i. Pipe insulation: Past limited asbestos inspections indicate that asbestos is present in pipe insulation and mudded fittings, asbestos is sporadic on domestic and heating system piping. The pipe insulation/fittings are generally in very good condition. Damaged fittings should be reported immediately to VCU Student Housing or OEHS if observed. Contact OEHS before conducting any maintenance or renovation activities which may damage or otherwise disturb the pipe insulation and/or mudded fittings.

ii. Sheetrock Joint Compound: Past testing has indicated that joint compound associated with sheetrock walls throughout is asbestos containing. Special care should be taken to avoid drilling, cutting, sawing, or otherwise damaging wall areas where joint compound is present.

b. Materials:

i. Flooring: Past inspection has revealed that vinyl floor tile and associated mastic throughout the structure is asbestos containing.

ii. Exterior/Roofing Materials: Flashing materials on portions of the roof are known to be asbestos containing. **The chiller and associated piping was abated from this roof c. 2003. The remainder of the flashing was left in place.** Prior to disturbing any roofing, window caulking/ putty/glazing materials contact the VCU Student Housing office and OEHS for clearance.

Clinical Support Center

Certain pipe insulations have mudded fittings that were determined to contain asbestos. These are limited, found generally in mechanical spaces on the second level to date. Red duct mastic found on ductwork above suspended ceilings was determined to be asbestos-containing. Floor tile and or mastic have been confirmed to be asbestos-containing material throughout much of this building.

Daniel Call House

Past survey by Callan Environmental found both friable and non-friable asbestos. These surveys were conducted prior to a 1989-1990 renovation. This renovation abated most of the known friable asbestos and recommended the non-friable asbestos be covered with carpeting. To date no follow up to this inspection has been performed, To date OEHS does not know the quality of this renovation. An asbestos inspection should be conducted prior to engaging in renovation/other activities with potential for disturbing asbestos-containing materials.

Egyptian Building

An extensive asbestos inspection of the structure in conjunction with the Fire Protection Improvements Project, circa 1995, is on file within the OEHS database.

A. Basement Level: All friable asbestos-containing materials were removed from the basement level, including the extensive connecting crawl space area, in conjunction with the Life, Health & Safety Improvement Project (see OEHS Database for inspection report, removal design and project monitoring records) circa. 1995. No other asbestos-containing materials are known to be present throughout the basement level.

B. First Floor-Auditorium:

1. Friable Materials: Extensive renovation of the area in the mid 1990's included removal of most exposed friable asbestos-containing pipe insulation materials.

Asbestos-containing pipe insulation, however, remains within wall spaces/pipe chases access to these areas is restricted to authorized personnel.

2. Non-friable Materials: Past inspection has revealed that vinyl floor tile and associated mastic, and mastic used to adhere 1x1 acoustical tiles to the ceilings throughout the area is asbestos containing.

C. Second Floor

1. Friable Materials: Damaged asbestos-containing mudded pipe fittings within the mechanical room pose an exposure risk if disturbed during maintenance or construction activities. Tasks with the potential for disturbing the asbestos-containing materials within the area should only be conducted by properly trained and protected personnel.

2. Non-friable Materials:

a. Flooring Materials: Past inspection has revealed that vinyl floor tile and associated mastic throughout the area is asbestos containing.

b. Ceiling Tile Adhesive: Asbestos-containing adhesive material ("pucks") are common in association with the old acoustical tile ceiling which lies above the lower (exposed) drop ceiling. These materials are considered non-friable and should not pose a significant exposure hazard unless physically altered in such a manner (sanding, grinding, pulverization etc., considered an OSHA prohibited practice) as to render them friable.

D. Third Floor

1. Friable Materials: Damaged asbestos-containing mudded pipe fittings within the mechanical room pose an exposure risk if disturbed during maintenance or construction activities. Tasks with the potential for disturbing the asbestos-containing materials within the area should only be conducted by properly trained and protected personnel.

2. Materials:

a. Flooring Materials: Past inspection has revealed that vinyl floor tile and associated mastic throughout the area is asbestos containing.

b. Ceiling Tile Adhesive: Asbestos-containing adhesive material ("pucks") are common in association with the old acoustical tile ceiling which lies above the lower (exposed) drop ceiling. These materials are considered and should not pose a significant exposure hazard unless physically altered in such a manner (sanding, grinding, pulverization etc., considered an OSHA prohibited practice) as to render them friable.

E. Fourth Floor

1. Friable Materials: Damaged asbestos-containing mudded pipe fittings within the mechanical room pose an exposure risk if disturbed during maintenance or construction activities. Tasks with the potential for disturbing the asbestos-containing materials within the area should only be conducted by properly trained and protected personnel.

2. Materials:

a. Flooring Materials: Past inspection has revealed that vinyl floor tile and associated mastic throughout the area is asbestos containing.

b. Ceiling Tile Adhesive: Asbestos-containing adhesive material ("pucks") are common in association with the old acoustical tile ceiling which lies above the lower (exposed) drop ceiling. These materials are considered and should not pose a significant exposure hazard unless physically altered in such a manner (sanding, grinding, pulverization etc., considered an OSHA prohibited practice) as to render them friable.

F. Fourth Floor Chase above Hard Ceiling

1. Friable Materials: Large amounts of damaged asbestos-containing pipe insulation and mudded pipe fittings within the interim space pose an exposure risk. Tasks with the potential for disturbing the asbestos-containing materials within the area should only be conducted by properly trained and protected personnel.

G. Roof/Exterior: ACM has been identified in the following materials:

1. Exterior Plaster: While considered a material the plaster material on all exterior surfaces is an asbestos-containing material. Any task involving physical disturbance of the exterior plaster materials must be conducted by properly trained and protected personnel with due notification given to OEHS.

2. Roofing Materials:

a. Flashing materials on sky lights (beneath non-asbestos membrane roof);

b. Window glazing materials, all windows;

c. Window caulks and putty materials, all windows.

Ben Johnson Auditorium

A. Ground Level: An in-depth survey was conducted for a major renovation, c. 2006, and is on file within the OEHS database. From the survey it was determined the entire ceiling, including the entrance foyer was fireproofed with crocodolite asbestos.

Subsequently all accessible fireproofing was abated however there remains a large amount of dislodged material that has within wall cavities/brick courses within the main auditorium/entrance foyer: wall spaces throughout are thus considered to be contaminated with asbestos-containing debris. Accessible friable pipe insulation was removed throughout the space during the 2006 abatement project: asbestos-containing pipe insulation on inaccessible piping within wall spaces, however, was not removed and remains a significant hazard.

1. Non-friable Materials: Mastic used to adhere wall and ceiling acoustical tiles was determined to contain asbestos. The majority of this material was abated during the 2006 renovations.

B. Penthouse: Piping and mastic pucks from wall tiles.

Grant House

Sporadic surveys have been performed over the years. They indicated various asbestos-containing building products.

A. Basement Level:

1. Friable Materials: Ceiling tiles were sampled throughout the basement. Ceiling tiles in two offices were determined to contain asbestos and were abated. Asbestos-containing pipe insulations above the hallway drop ceilings were found and remain intact.

2. Non-friable Materials: Flooring was abated from most spaces during several renovations. Hard wall plaster, wallboard and joint compound and remaining ceiling tiles were determined to be asbestos free, as was window caulking and glazing. However sink backing was determined to be asbestos and abated.

B. Remaining Floors: Pending inspection.

Hospitality House (MCV)

Pending inspection/record review.

Hunton Hall

Building has undergone extensive renovation c. 2005. Hunton Hall was constructed prior to the use of asbestos as a standard building product, therefore asbestos in this structure is limited and from later dates. The 2005 renovations removed all friable and non-friable asbestos-containing materials from ***accessible*** areas of the building interior. Renovation also included removal of friable materials (pipe insulation/debris) from ***known*** inaccessible areas–including pipe spaces, however, care should be taken when entering chases/wall spaces should suspect material be encountered OEHS should be contacted prior to proceeding/potentially disturbing.

The extent of asbestos-containing materials on the exterior of the structure in not known. Until tested all suspect materials (window glazing/caulking, roofing materials, sealants, etc.) should be managed as asbestos-containing materials.

Larrick Student Center – Demolished 2007

Building underwent a full asbestos inspection and all asbestos was abated, prior to demolition.

Leigh House

Limited file information is available for this building. Pending inspection/record review

Lyons Dental Building

Restricted Areas:

1. Ceilings spaces: On the fourth floor. Do not access area unless cleared by OEHS.

2. Pipe chases, wall spaces *throughout* (ACM: fireproofing/debris, pipe insulation). Do not access area unless cleared by OEHS.

Despite extensive past abatement, areas presenting significant asbestos exposure hazards remain within this structure. The most significant exposure risk is presented by spray-applied asbestos-containing fireproofing materials which are widespread above suspended ceilings on the fourth floor and limited areas of the basement level and within inaccessible areas (pipe chases, wall spaces, brick courses, crevices, penetrations, behind, above and under the escalator etc.) throughout much of the structure – access into these areas is restricted to authorized personnel. In addition to fireproofing materials, the Lyons Building contains many other asbestos-containing building materials including: thermal pipe insulation, transite materials, vinyl floor tile/mastic, roofing materials, laboratory countertops, sink backing materials and several other building products. Asbestos-containing pipe insulation materials present an exposure hazard within much of the building. Due to the effects of aging, as well as water and contact damage the asbestos-containing pipe insulation materials are continually degrading. While much of the asbestos-containing pipe insulation has been removed, it is crucial the remaining exposed materials be monitored and repaired regularly to avoid deterioration to a highly friable condition. If damaged suspect pipe insulation or fireproofing materials are encountered contact OEHS (828-4404) as soon as possible so that necessary repair/removal operations can be arranged.

The Lyons Dental Building has undergone numerous asbestos abatement projects since the mid 1980's. The scope and quality of past abatement projects was highly Variable, sometimes resulting in incomplete removal with sporadic areas of residual asbestos contamination evident in some areas which should have been thoroughly

abated. Due to this fact, VCU policy is to consider all ceiling areas and inaccessible spaces throughout the structure to be asbestos contaminated unless clearly designated as a "clean" area within this text: OEHS must be contacted prior to engaging in any construction/maintenance activities with the potential for disturbing asbestos containing materials within these areas. Care must also be taken to avoid damaging pipe insulation and other suspect materials which may be asbestos containing: contact OEHS to determine status of any suspicious material(s) prior to disturbing them. Fortunately, the vast majority of friable asbestos-containing materials (fireproofing, pipe insulation) within the structure are enclosed behind suspended ceilings, permanent ceilings, masonry walls and other effective barriers, limiting staff exposure potential. Due to the amount of friable asbestos-containing materials involved it is critical that the integrity of these barriers be maintained and that unauthorized access into contaminated spaces be avoided.

In order to ensure the effectiveness of the existing barriers, OEHS conducts semi-annual air monitoring (via PCM and/or TEM analytical methods) and visual inspections of the entire building. To date (February 1, 2010) air monitoring data has not indicated asbestos levels above the OSHA established Action Level of 0.10 fibers/cc, or the EPA recognized "Clean Air" level of 0.01 fibers/cc. The O & M air monitoring results and the observations made during visual inspections indicate that the existing barriers are currently providing adequate protection between occupied areas and areas of asbestos contamination. Results from the most recent round of O & M air monitoring and surveillance are provided in Appendix E.
The most recent visual inspection and record review (February, 01, 2010) conducted by OEHS indicate the following asbestos hazards within the Lyons Building:

I. Basement Level:

A. Accessible Friable Materials: Three major asbestos abatement projects have been conducted to date within the Basement Level: "Lyons Building North Administration Area", circa 1987 (no records for this project are on file); "Lyons Building Mechanical Room Abatement Project", dated August 8, 1995 (full records on file), “Lyons Building North Basement Abatement”, circa fall 2004 to spring 2005. Quality control (QC) sampling conducted by OEHS ("Life, Health & Safety Improvements, May 15, 1994; Lyons Building Basement Computer Room Renovation, June 17, 1994) within the area affected by the 1987 project indicated that a near thorough abatement was performed. A few of the samples collected indicated that traces of asbestos-containing fireproofing may have missed in isolated areas of the ceiling deck. The residual materials, however, were minute in concentration, treated with encapsulent and covered entirely with no asbestos fireproofing spray back, and as such, are not considered a significant health risk at this time. The 1995 and 2005 abatement projects adequately abated all accessible friable asbestos-containing fireproofing materials in all areas with the exception of the basement janitor closet ceiling area – access to this area is restricted to authorized personnel.

B. Inaccessible Friable Materials: Throughout; wall spaces, chases, brick courses, and isolated areas of mechanical room ceiling (marked by hazard signage):

fireproofing materials, pipe insulation/mudded fittings, dust/debris materials. Wall spaces, chases and brick courses in all basement areas are considered to be asbestos contaminated regardless of history of past abatement. Past abatement projects addressed asbestos-containing materials in accessible areas only. Access into the contaminated inaccessible spaces is restricted to authorized, properly trained/protected personnel.

The 1995 mechanical room abatement project addressed all accessible asbestos-containing materials, limited areas between the upper surface of ductwork and the concrete ceiling deck could not be accessed for completion of asbestos removal. The remnant areas were sealed with fireboard and fire-stop caulking and clearly marked with suitable warning signage at project completion. The residual asbestos-containing fireproofing materials should not pose a health threat unless the seals are disturbed.

C. Non-friable asbestos-containing materials:

1. Asbestos-containing vinyl floor tile and associated mastic materials are widespread throughout the level. These materials are considered non-friable and should not pose a significant exposure hazard unless physically altered in such a manner (sanding, grinding, and pulverization etc., considered an OSHA prohibited practice) as to render them friable. All vinyl flooring materials and mastic should be considered to be asbestos-containing materials until cleared by OEHS.

2. Asbestos-containing adhesive and vibration joint cloth materials are common on ductwork seams and connections throughout ceiling spaces. These materials are considered and should not pose a significant exposure hazard unless physically altered in such a manner (sanding, grinding, and pulverization etc., considered an OSHA prohibited practice) as to render them friable.

3. Additional asbestos-containing materials may include:
-Sink backing materials: underside of sink basins, widespread.
-Gasketing; boilers and high pressure steam valve/connectors (mechanical room).
-Elevator doors (assumed).
-Fire doors; all door interiors should be considered asbestos containing until tested/cleared by OEHS.

D. The entire north stairwell was abated and demolished, c. 2008 for the addition of the Baxter Perkinson building.

II. First Floor:

A. Abatement of Accessible Friable Materials (fireproofing and pipe insulation materials)

1. Clinic and Support Areas (abated in 1987-1988). The quality of this abatement project appears to have been quite good for the time period, quality

control sampling conducted by OEHS in 1994 ("Life, Health & Safety Improvements") and 1996 ("Oral Surgery Renovation: Asbestos Abatement"), however, did indicate that residue from the original asbestos-containing fireproofing was present on the ceiling deck in isolated areas beneath limited areas of the nonasbestos spray back. Since the residual fireproofing materials were encapsulated and are covered with nonasbestos-containing sprayback materials exposure hazard appears to be minimal. OEHS should be contacted prior to engaging in any maintenance or renovation activities with potential for disturbing residual asbestos-containing materials that may be present beneath spray back material.

2. Remaining Areas: Abatement of the remainder of the accessible ceiling areas of the 1st Floor, including the student lounge and west lobby area was completed under the "Life, Health & Safety Improvements Project", dated April 10, 1996. Abatement of these ceilings areas is considered to have been complete; however a mural wall above the drop ceiling was isolated with polyethylene sheeting and marked with asbestos stickers. OEHS should be contacted prior to engaging in any maintenance or renovation activities with potential for disturbing residual asbestos-containing materials that are present behind the polyethylene barrier.

B. Inaccessible Friable Asbestos-Containing Materials: Throughout; wall spaces, chases and brick courses: Fireproofing materials, pipe insulation/mudded fittings, dust/debris materials. Wall spaces, chases and brick courses in all areas are considered to be asbestos contaminated regardless of history of past abatement. Past abatement projects generally addressed asbestos-containing materials in accessible areas only. Access into the contaminated inaccessible spaces is restricted to authorized, properly trained/protected personnel.

C. Escalator Housings: Asbestos hazards within machinery and adjacent areas between machinery/support structure and walls were abated circa 2000. Limit of abatement has been indicated by construction of barriers and posting of asbestos warning signage. Significant asbestos exposure hazards are present in wall spaces beyond barriers. Access to areas beyond barriers is limited to authorized personnel.

D. asbestos-containing materials:

1. Asbestos-containing vinyl floor tile and associated mastic materials are widespread throughout the level. These materials are considered and should not pose a significant exposure hazard unless physically altered in such a manner (sanding, grinding, pulverization etc.) as to render them friable. All vinyl flooring materials and mastic should be considered to be asbestos-containing materials until cleared by OEHS.

2. Asbestos-containing adhesive and vibration joint cloth materials are common on ductwork seams and connections throughout ceiling spaces. These materials are considered and should not pose a significant exposure hazard unless physically altered in such a manner (sanding, grinding, pulverization etc.) as to render them friable.

3. Additional asbestos-containing materials may include:

a. Sink backing materials: underside of sink basins, widespread.

b. Laboratory counter tops/fume hood casings.

c. Elevator doors (assumed).

d. Fire doors; all door interiors should be considered asbestos containing until tested/cleared by OEHS.

e. Sink backing materials.

III. Second Floor:

A. Accessible Friable Materials: Accessible ceiling spaces were adequately abated during: “Clinic and Support Areas Abatement” (circa 1987-1988) and "Life, Health & Safety Improvements Abatement" (circa 1996).

B. Inaccessible Friable Asbestos-Containing Materials: Throughout; wall spaces, chases and brick courses: Fireproofing materials, pipe insulation/mudded fittings, dust/debris materials. Wall spaces, chases and brick courses in all areas are considered to be asbestos contaminated regardless of history of past abatement. Past abatement projects generally addressed asbestos-containing materials in accessible areas only. Access into the contaminated inaccessible spaces is restricted to authorized, properly trained/protected personnel.

C. asbestos-containing materials:

1. Asbestos-containing vinyl floor tile and associated mastic materials are widespread throughout the level. These materials are considered and should not pose a significant exposure hazard unless physically altered in such a manner (sanding, grinding, pulverization etc.) as to render them friable. All vinyl flooring materials and mastic should be considered to be asbestos-containing materials until cleared by OEHS.

2. Asbestos-containing adhesive and vibration joint cloth materials are common on ductwork seams and connections throughout ceiling spaces. These materials are considered and should not pose a significant exposure hazard unless physically altered in such a manner (sanding, grinding, pulverization etc.) as to render them friable.

3. Additional asbestos-containing materials may include:

a. Sink backing materials: underside of sink basins, widespread.

b. Laboratory counter tops/fume hood casings.

c. Elevator doors (assumed).

d. Fire doors; all door interiors should be considered asbestos containing until tested/cleared by OEHS.

e. Sink backing materials.

IV. Third Floor:

A. Accessible Friable Materials: Accessible ceiling spaces were adequately abated during: “Clinic and Support Areas Abatement” (circa 1987-1988) and "Life, Health & Safety Improvements Abatement" (circa 1996). However, during a subsequent abatement of walls and flooring for the Manikin Simulation project, (monitored by an outside monitoring firm) the spray back fireproofing was inadequately protected and was contaminated with asbestos-containing fireproofing.

B. Inaccessible Friable Asbestos-Containing Materials: Throughout; wall spaces, chases and brick courses: Fireproofing materials, pipe insulation/mudded fittings, dust/debris materials. Wall spaces, chases and brick courses in all areas are considered to be asbestos contaminated regardless of history of past abatement. Past abatement projects generally addressed asbestos-containing materials in accessible areas only. Access into the contaminated inaccessible spaces is restricted to authorized, properly trained/protected personnel.

C. asbestos-containing materials:

1. Asbestos-containing vinyl floor tile and associated mastic materials are widespread throughout the level. These materials are considered and should not pose a significant exposure hazard unless physically altered in such a manner (sanding, grinding, pulverization etc.) as to render them friable. All vinyl flooring materials and mastic should be considered to be asbestos-containing materials until cleared by OEHS.

2. Asbestos-containing adhesive and vibration joint cloth materials are common on ductwork seams and connections throughout ceiling spaces. These materials are considered and should not pose a significant exposure hazard unless physically altered in such a manner (sanding, grinding, pulverization etc.) as to render them friable.

3. Additional asbestos-containing materials may include:

a. Sink backing materials: underside of sink basins, widespread.

b. Laboratory counter tops/fume hood casings.

c. Elevator doors (assumed).

d. Fire doors; all door interiors should be considered asbestos containing until tested/cleared by OEHS.

V. Fourth Floor:

A. Accessible Friable Materials: To date (02/01/10) only limited ceiling spaces have been abated – widespread asbestos-containing fireproofing and related debris present a significant exposure hazard in ceiling spaces throughout much of the floor. Ceiling spaces throughout level should not be accessed or disturbed without notification and prior written clearance from OEHS.

B. Inaccessible Friable Asbestos-Containing Materials: Throughout; wall spaces, chases and brick courses: Fireproofing materials, pipe insulation/mudded fittings, dust/debris materials. Wall spaces, chases and brick courses in all areas are considered to be asbestos contaminated regardless of history of past abatement. Past abatement projects generally addressed asbestos-containing materials in accessible areas only. Access into the contaminated inaccessible spaces is restricted to authorized, properly trained/protected personnel.

C. asbestos-containing materials:

1. Asbestos-containing vinyl floor tile and associated mastic materials are widespread throughout the level. These materials are considered and should not pose a significant exposure hazard unless physically altered in such a manner (sanding, grinding, pulverization etc.) as to render them friable. All vinyl flooring materials and mastic should be considered to be asbestos-containing materials until cleared by OEHS.

2. Asbestos-containing adhesive and vibration joint cloth materials are common on ductwork seams and connections throughout ceiling spaces. These materials are considered and should not pose a significant exposure hazard unless physically altered in such a manner (sanding, grinding, pulverization etc.) as to render them friable.

3. Additional asbestos-containing materials may include:

a. Sink backing materials: underside of sink basins, widespread.

b. Laboratory counter tops/fume hood casings.

c. Elevator doors (assumed).

d. Fire doors; all door interiors should be considered asbestos containing until tested/cleared by OEHS.

VI. Building Exterior: Asbestos-containing materials were removed from the entire roof circa 2000. Fireproofing is heavily concentrated behind/under pre-cast façade. Remaining asbestos-containing materials on the building exterior include: window glazing, all window units; window caulk/putty, all windows units and framework. Each of the above-listed materials should not pose a significant exposure hazard unless physically altered in such a manner (sanding, grinding, pulverization etc.) as to render them friable. Operations with the potential of creating such a disturbance of these asbestos-containing materials should only be conducted by licensed, properly trained/protected personnel.

Main Hospital

1. Friable Materials: Past inspections (refer to OEHS Database for analytical data) have indicated that friable asbestos-containing materials may be present within limited unoccupied crawl space areas in the basement/subbasement of the structure. Asbestos-containing materials within crawl spaces may include pipe insulation, dust/ debris and contaminated soil. These asbestos-containing materials may be damaged and friable, and where concentrated may present an exposure threat to unprotected personnel accessing the crawl spaces without authorization. Prior to entering any unfamiliar crawl space OEHS should be contacted to investigate asbestos status.

2. Asbestos-Containing Materials: Widespread throughout building. The following building materials should be considered to be asbestos-containing materials throughout Main Hospital until written confirmation of asbestos status has been obtained from OEHS:

a. Floor tile and mastic: 12" tile and black mastic used to adhere tile to concrete flooring throughout the structure.

b. Duct mastic: steel ductwork connections throughout.

c. Sink backing materials: underside of sink basins, widespread.

d. Roof flashing and sealant materials; common on all roof levels.

e. Gasketing; boilers and high pressure steam valve/connectors.

f. Elevator doors (assumed);

g. Fire doors; all door interiors should be considered asbestos containing until tested/cleared by OEHS.

h. White pipe mastic, generally found on fiberglass pipe insulation.

i. Brownish covering on converters and limited piping in the basement mechanical room.

The above-listed asbestos-containing materials must be removed by properly trained and protected personnel prior to conducting any maintenance or Construction activities with the potential for rendering the materials friable (sawing, cutting, sanding, drilling, pulverizing et.al.).

Massey Cancer Center

Limited survey information is available. Past inspections have indicated that vinyl floor tile/associated mastic, laboratory counter tops, fume hood casing, sink backing, duct sealant, mudded fittings, and mastic on pipe insulation may be asbestos-containing materials throughout the entire structure. Status of exterior materials is unknown, pending inspection/record review

McGuire Hall & Annex

Limited survey information is available. Past inspections have indicated that vinyl floor tile/associated mastic, laboratory counter tops, fume hood casing, pipe insulation, mudded pipe fittings, mechanical insulation, window caulking/glazing, and roofing materials may be asbestos-containing materials throughout the entire structure.

Extensive amounts of asbestos-containing pipe insulation materials are known to be common in accessible areas including: corridors, research labs and support spaces, tunnels, and mechanical rooms; and in inaccessible areas including: pipe chases, wall spaces, and bulkheads. Several abatement projects have been performed and a large quantity of accessible pipe insulation was abated on the first through fourth floors, however much remains. An asbestos material was used as a covering on the basement incinerator top and remains intact.

McRae Hall

a. Friable Materials: Asbestos inspections conducted circa. 1997 (“MCV Low-Rise Dormitories, Renovation”) indicates that the only friable materials present are mudded fittings on domestic and heating system piping. The levels of asbestos detected were from trace to very low concentrations, pipe fittings are sparse and generally in very good condition. Damaged fittings should be reported immediately to VCU Student Housing or OEHS if observed. Contact OEHS before conducting any maintenance or renovation activities which may damage or otherwise disturb the mudded fittings.

b. Materials:

i. Flooring: Past inspection has revealed that vinyl floor tile and associated mastic throughout the structure is asbestos containing.

ii. Exterior/Roofing Materials: Flashing materials on portions of the roof are known to be asbestos containing. Prior to disturbing any roofing, window caulking/ putty/glazing materials contact the VCU Student Housing office and OEHS for clearance.

MCV Steam Plant (New)

Facility constructed in late 1990s, building is considered to be asbestos free.

MCV Steam Plant (Old)

Asbestos-containing materials removed, structure demolished in 2005. Historical records maintained in OEHS database.

Medical Sciences Building

Facility constructed in 1996, building is considered to be asbestos free.

Nelson Clinic

Limited survey information is available. Past inspections have indicated that vinyl floor tile/associated mastic, sink backing, duct sealant, and mudded fittings can be asbestos-containing materials throughout the entire structure. Status of exterior materials was sampled and caulking between cast block was determined to non-asbestos containing.

Newton House

Pending inspection/record review

North Hospital

1. Friable Materials: Past inspections (refer to OEHS Database for analytical data) have indicated that friable asbestos-containing materials are present within extensive unoccupied crawl space areas in the subbasement of the structure. Asbestos-containing materials within crawl spaces may include thermal insulation debris (in/on dirt floors only) and contaminated soil. These asbestos-containing materials are highly damaged and friable, and may present an exposure threat to unprotected personnel accessing the crawl spaces without authorization. An abatement of a portion of the crawlspace was completed and a wall erected with a locked door separates the contaminated from the uncontaminated portion of the space. Also, a recent renovation to add new equipment uncovered asbestos piping in a wall section, this type material may be encountered in the lower levels of this building as the structure demolished to build North was either partially buried or partially reused and incorporated into the existing structure. Prior to entering any North Hospital crawl space OEHS should be contacted to investigate asbestos status and indicate required level of PPE/training.

2. Asbestos-Containing Materials: Widespread throughout building. The following building materials should be considered to be asbestos-containing materials throughout Main Hospital until written confirmation of asbestos status has been obtained from OEHS:

a. Floor tile mastic: beneath 12" (nonasbestos) vinyl floor tile throughout the structure.

b. Duct mastic: steel ductwork connections throughout.

c. Sink backing materials: underside of sink basins, widespread.

d. Roof flashing and sealant materials; common on all roof levels.

e. Gasketing; boilers and high pressure steam valve/connectors.

f. Elevator doors (assumed).

g. Fire doors; all door interiors should be considered asbestos containing until tested/cleared by OEHS.

h. Sink Backing (assumed).

The above-listed asbestos-containing materials must be removed by properly trained and protected personnel prior to conducting any maintenance or Construction activities with the potential for rendering the materials friable (sawing, cutting, sanding, drilling, pulverizing et.al.).

Nurse Education Building

Demolished, after all asbestos-containing building materials identified were abated. Records of the abatement process and asbestos history are available in the asbestos data maintained in VMI Building, Suite 107.

Old City Hall

Limited knowledge exists regarding this building. A limited number of offices are leased by university and hospital department. The building is managed by the Department of General Services.

Parking and Mail Services Offices

Building erected post 1989. No asbestos-containing materials are known to be present throughout the structure, thus renovation and maintenance activities do not require prior OEHS notification.

Parking "D" Deck

All suspect asbestos-containing building materials on this structure were sampled, c. 1997, materials found to contain asbestos were abated the same year, elevator doors were assumed to contain asbestos and abated at this time. The structure is considered to be asbestos free.

Parking "E & S" Deck

Pending inspection/record review

Parking "I" Lot

“I” lot is a surface parking lot; no suspect asbestos products are present.

Parking "N" Deck

Building erected post 1989. No asbestos-containing materials are known to be present throughout the structure, thus renovation and maintenance activities do not require prior OEHS notification.

Physical Plant Shops Building

Building demolished in 2005, historical records maintained in OEHS database.

Physical Plant Storage Facility

Pending inspection/record review

Randolph Minor Annex

Limited survey information is available. Past inspections have indicated that vinyl floor tile/associated mastic, laboratory counter tops, fume hood casing, pipe insulation, mudded pipe fittings, mechanical insulation, window caulking/glazing, and roofing materials is asbestos-containing throughout much of the structure. Extensive amounts of asbestos-containing pipe insulation materials are known to be common in accessible areas of the basement and are thought to be building-wide in inaccessible areas including: pipe chases, wall spaces, and bulkheads. Floor tile, mastic and laboratory table tops was abated from the basement laboratory, c. 2005-6, and from the first floor corridors and selected offices, c. 2008.

Randolph Minor Hall

Asbestos removed throughout 2003, building demolished 2004, historical records maintained in OEHS database.

Recreation Aquatics Center

Limited survey information was collected for the Larrick Building demolition. Original floor tile and mastic within the building was determined to contain asbestos. This material was abated in select areas for the new building tie ins, elsewhere it remains.

Richmond Plaza Building

Pending inspection/record review

Rudd Hall

1. Friable Materials: Asbestos inspections conducted circa. 1997 ("MCV Low-Rise Dormitories, Renovation") indicates that the only friable materials present are mudded fittings on domestic and heating system piping. The levels of asbestos detected were from trace to very low concentrations, pipe fittings are sparse and generally in very good condition. Damaged fittings should be reported immediately to VCU Student Housing or OEHS if observed. Contact OEHS before conducting any maintenance or renovation activities which may damage or otherwise disturb the mudded fittings.

2. Non-Friable Materials:

a. Flooring: Past inspection has revealed that vinyl floor tile and associated mastic throughout the structure is asbestos containing.

b. Exterior/Roofing Materials: Flashing materials on portions of the roof are known to be asbestos containing. Prior to disturbing any roofing, window caulking/ putty/glazing materials contact the VCU Student Housing office and OEHS for clearance.

Samuel Putney House

This structure was built prior to the widespread use of asbestos in building products. Flooring in the basement was determined to be asbestos-containing and abated, c. 2004-5, windows were sampled, exterior caulking throughout the structure was determined to be asbestos-containing. Windows were stabilized (only loose flaking material abated) and painted, c.2006, finally the mastic on roofing throughout contains asbestos.

Sanger Hall

Comprehensive asbestos inspections have been conducted twice previously within Sanger Hall. The first comprehensive inspection (Hall-Kimbrell Inspection, circa. 1987) addressed only friable suspect materials. The second comprehensive inspection (Fire Safety Improvements: Phase I Inspection; Phase II/III Inspection, circa.1996) was conducted in-house and addressed all (friable and) suspect materials. Both inspection reports (along with several other partial inspection reports)

are maintained on file within the OEHS asbestos database. Sanger Hall has undergone extensive asbestos abatement in conjunction with large-scale renovation projects over the past decade, resulting in the elimination/control of friable materials in accessible areas.

The following summary of current asbestos-related conditions within Sanger Hall is broken down by construction phase. Sanger Hall was constructed in three separate phases: Phase I was erected in 1963 and includes the north and east wings of the structure level B3 through the 10th Floor; Phase II was constructed in 1968 and includes only the three floors located directly above the Phase I construction (11th Floor through penthouse level). Phase III was erected in 1973 and includes the southern section of the building level B3 through penthouse level.

I. PHASE I CONSTRUCTION

A. Level B3:

1. Mechanical Room: The room underwent extensive abatement during 2003/2004 in relation to an HVAC renovation project. Asbestos insulation on air-handlers and ductwork throughout the space was removed. The project also included removal and repair of extensive sections of asbestos-containing pipe insulation, remaining asbestos-containing pipe insulation is generally in good condition. A summary of remaining asbestos containing materials is provided below:

a. Thermal pipe insulation: All pipe systems, valves and tees - extensive;

b. Mechanical insulation: Two large 5,000 gallon storage tanks were abated of covering, c. 2008, and removed, other Tanks, converters, steam traps, and piping - extensive.

The above-listed friable asbestos-containing materials are regularly monitored and repaired as needed by the VCU Asbestos Abatement Team. The area is considered safe for university staff to conduct routine maintenance activities, however, non-routine tasks with the potential for disturbing the asbestos-containing materials within the area should only be conducted by authorized personnel.

2. Administrative Areas (offices, computer rooms, corridors, etc.)

a. Ceiling Spaces: Sporadic runs of asbestos-containing pipe insulation are present above drop ceilings throughout the area. These materials were in good shape at the time of the latest inspection (HVAC replacement, circa 2003) and should not pose an exposure hazard unless physically disturbed.

b. Unexposed Materials: Damaged, friable asbestos-containing pipe insulation is present within isolated wall spaces and pipe chases: these areas should only be accessed by authorized personnel.

c. Asbestos-Containing Materials:

i. Asbestos-containing vinyl floor tile and associated mastic materials are widespread throughout the level. These materials are considered non-friable and should not pose a significant exposure hazard unless physically altered in such a manner (sanding, grinding, pulverization etc.) as to render them friable. All vinyl flooring materials and mastic should be considered to be asbestos-containing materials until testing has been conducted by OEHS.

ii. Asbestos-containing adhesive and vibration joint cloth materials are common on ductwork seams and connections throughout ceiling spaces. These materials are considered and should not pose a significant exposure hazard unless physically altered in such a manner (sanding, grinding, pulverization etc.) as to render them friable.

……iii. Laboratory table tops found throughout various labs.

B. Level B2 through 9th Floor, 10th Floor Gross Anatomy and Support Areas:

1. Accessible friable asbestos-containing materials:

a. Walkable Riser Shaft: Thermal pipe insulation: steam/hot water service piping, include elbows, valves and tees. These asbestos-containing materials were repaired (covered with heavy bridging encapsulant) in conjunction with the "Sanger Hall Pipe Replacement Project", circa 1996 - 1999. This area is considered safe for university staff to conduct routine maintenance activities, however, nonroutine tasks with the potential for disturbing the asbestos-containing materials within the area should only be conducted by authorized personnel.

b. Exposed Ceilings: Sporadic asbestos-containing mudded pipe fittings and pipe insulation are exposed on piping associated with HVAC mixing boxes and fan coil units in limited areas including laboratories, shop areas, and the northeast stairwell . These materials were repaired as needed by the VCU Asbestos Abatement Team (School of Medicine Renovation) during the fall of 1999 and should not pose an exposure hazard unless physically disturbed.

c. Ceiling Spaces: Sporadic runs of asbestos-containing pipe insulation are present above drop ceilings throughout the center (north wing) section on all levels. These materials were repaired as needed by the VCU Asbestos Abatement Team (School of Medicine Renovation) during the fall of 1999 and should not pose an exposure hazard unless physically disturbed. Asbestos-containing pipe insulation was removed form ceiling spaces throughout east (Marshall Street) corridor by 2000.

d. Inaccessible/low access areas: Damaged, friable asbestos-containing pipe insulation are be present within wall spaces, shafts and pipe chases - these areas should only be accessed by authorized personnel.

e. An abatement project was conducted to renovate the entire Gross Anatomy laboratory. All laboratory table tops, and ductwork within these two rooms was abated. Mudded joints were abated as needed, as an additive bid item the short hallway form the Gross Anatomy labs to the explosion proof doors was abated of asbestos above the drop ceilings. An associated small mechanical room was left intact and contains friable asbestos piping and storage tanks.

f. asbestos-containing materials:

i. Asbestos-containing vinyl floor tile and associated mastic materials are widespread throughout all levels. These materials are considered and should not pose a significant exposure hazard unless physically altered in such a manner (sanding, grinding, pulverization etc.) as to render them friable. All vinyl flooring materials and mastic should be considered to be asbestos-containing materials until testing has been conducted by OEHS.

ii. Asbestos-containing adhesive and vibration joint cloth materials are common on ductwork seams and connections throughout ceiling spaces. These materials are considered and should not pose a significant exposure hazard unless physically altered in such a manner (sanding, grinding, pulverization etc.) as to render them friable.

iii. Laboratory counter tops, sink basins (include lecture rooms) and hood casings are also asbestos-containing materials. These materials are common within laboratory spaces throughout.

iv. Transite Board: Walls in isolated areas (1st Floor administrative area, used for office partitions, other isolated offices) are constructed of asbestos-containing transite. Prior to disturbing any walls, contact OEHS to determine whether asbestos is an issue.

v. Other asbestos-containing materials which may be encountered within laboratory spaces include thermal gloves, heat resistant pads, fire brick and sink backing mastic.

C. <u>10th Floor: Mechanical Spaces</u>:

1. Mechanical Room: The room underwent extensive abatement during 2000/2001 in relation to an HVAC renovation project. Asbestos insulation on supply air-handlers and ductwork throughout the space was removed. Abatement of asbestos insulation from return duct/fan equipment was partial. All asbestos-containing insulation on return ducts/fan equipment that was not removed was subjected to extensive repair (encapsulated/covered with canvass cloth) and labeled with appropriate asbestos hazard warning signage – encapsulated/enclosed asbestos-containing materials should only be disturbed by authorized properly trained and protected personnel. The project also included removal and repair of extensive

sections of asbestos-containing pipe insulation, remaining asbestos-containing pipe insulation is generally in good condition. A summary of remaining asbestos containing materials is provided below:

a. Thermal pipe insulation: Limited amounts remain on pipe systems, valves and tees – especially in areas with limited access.

b. Mechanical insulation: Limited tanks, converters, steam traps.

c. Insulation on return air ducts and fan equipment – extent identified through asbestos warning signs.

The above-listed friable asbestos-containing materials are regularly monitored and repaired as needed by the VCU Asbestos Abatement Team. The area is considered safe for university staff to conduct routine maintenance activities, however, nonroutine tasks with the potential for disturbing the asbestos-containing materials within the area should only be conducted by authorized personnel.

II. PHASE II CONSTRUCTION

A. 11th and 12th Floors:

1. Friable Materials:

Accessible, Walkable Riser Shaft: Thermal pipe insulation on steam/hot water service piping, include elbows, valves and tees. These asbestos-containing materials were repaired (covered with heavy bridging encapsulant) in conjunction with the "Sanger Hall Pipe Replacement Project", circa 1996 - 1999. This area is considered safe for university staff to conduct routine maintenance activities, however, nonroutine tasks with the potential for disturbing the asbestos-containing materials within the area should only be conducted by properly trained and protected personnel with due notification provided to OEHS.

2. Inaccessible, Pipe Chases/Shafts: Damaged, friable asbestos-containing pipe insulation may be present within wall spaces, shafts and pipe chases - these areas should only be accessed by authorized personnel.

3. asbestos-containing materials:

i. Asbestos-containing vinyl floor tile and associated mastic materials are widespread throughout all levels. These materials are considered and should not pose a significant exposure hazard unless physically altered in such a manner (sanding, grinding, pulverization etc.) as to render them friable. All vinyl flooring materials and mastic should be considered to be asbestos-containing materials until testing has been conducted by OEHS.

ii. Asbestos-containing adhesive and vibration joint cloth materials are common on ductwork seams and connections throughout ceiling spaces. These materials are considered and should not pose a significant exposure hazard unless physically altered in such a manner (sanding, grinding, pulverization etc.) as to render them friable.

iii. Laboratory counter tops, sink basins (include lecture rooms) and hood casings are also asbestos-containing materials. These materials are common within laboratory spaces throughout.

v. Other asbestos-containing materials which may be encountered within laboratory spaces include thermal gloves, heat resistant pads, fire brick and sink backing mastic.

B. Penthouse Level:

1. Accessible friable asbestos-containing materials:

a. Mechanical Room:

i. Thermal pipe insulation: Steam supply/return system: runs elbows, valves and tees – extensive. All other piping systems: mudded elbows - extensive.

ii. -Mechanical insulation: Converters; steam traps, throughout.

b. Elevator Room: Thermal pipe insulation: limited, west wall.

The above areas are considered safe for university staff to conduct routine maintenance activities, however, non-routine tasks with the potential for disturbing the asbestos-containing materials within the area should only be conducted by properly trained and protected personnel.

2. asbestos-containing materials: Asbestos-containing gasketing and vibration joint cloth materials are common in association with HVAC equipment and related piping/ducted system within mechanical areas. These materials are considered and should not pose a significant exposure hazard unless physically altered in such a manner (sanding, grinding, pulverization etc.) as to render them friable.

III. PHASE III CONSTRUCTION

A. Level B3:

1. Accessible friable asbestos-containing materials:

a. Mechanical Room (B3-037): Thermal pipe insulation: all pipe systems, valves and tees – extensive. The above-listed materials were in very good condition at the time of the last reconnaissance of the area (02/05). The area is considered safe for university staff to conduct routine maintenance activities, however, non-routine tasks with the potential for disturbing the asbestos-containing materials within the area should only be conducted by properly trained and protected personnel.

b. East Central Laboratories (B3-020, B3-022, B3-024, B3-026 and B3-028), Thermal pipe insulation and mudded fittings. The above listed materials have been covered with fiberglass insulation. The related exposure potential is limited unless the fiberglass jacket is removed and the underlying asbestos-containing pipe insulation is physically disturbed.

c. Steam Access Closets: Thermal pipe insulation: The asbestos-containing pipe insulation with both steam closets is exposed (unjacketed). The material is in poor condition and some related debris materials are present on the underlying concrete floors. Access into the steam closets is difficult and gained through narrow hatches which are kept locked. These spaces should only be accessed by authorized personnel.

d. Ceiling Spaces: Asbestos-containing thermal pipe insulation is present on a high pressure steam line which traverses the ceiling space of the north and south corridors. These materials were repaired and wrapped with protective cloth by the VCU Asbestos Abatement Team in conjunction with the "Sanger Hall Energy Conservation Measure" project during the fall of 1998, and should not pose an exposure hazard unless physically disturbed.

2. Inaccessible friable asbestos-containing materials: Damaged, friable asbestos-containing pipe insulation is suspected to be present within wall spaces and pipe chases - these areas should only be accessed by authorized personnel.

3. asbestos-containing materials:

i. Asbestos-containing vinyl floor tile and associated mastic materials are widespread throughout the level. All vinyl flooring materials and mastic should be considered to be asbestos-containing materials until testing has been conducted by OEHS.

ii. Asbestos-containing tar/mastic is present in several locations on nonasbestos-containing fiberglass lagging which insulates chilled water piping. This material is present primarily above drop ceilings and is considered .

iii. Asbestos-containing adhesive and vibration joint cloth materials are common on ductwork seams and connections throughout ceiling spaces.

iv. Asbestos-containing tar/felt water-proofing materials are present above drop ceilings on the north wall bordering the Phase I Construction Area.

The above-listed materials are considered non-asbestos containing and should not pose a significant exposure hazard unless physically altered in such a manner (sanding, grinding, pulverization etc.) as to render them friable.

B. Level B2:

1. Accessible friable asbestos-containing materials: Cage Wash Rooms (B2-064, B2-064), Service Chase (B2-066): Thermal pipe insulation: steam supply lines; The above-listed friable asbestos-containing materials were in very good condition at the time of the last visual inspection (February 2005). The area is considered safe for university staff to conduct routine maintenance activities, however, nonroutine tasks with the potential for disturbing the asbestos-containing materials within the area should only be conducted by properly trained and protected personnel.

2. Inaccessible friable materials: Southeast Steam Riser Shaft: Thermal pipe insulation, debris material. The asbestos-containing pipe insulation within the shaft is exposed (unjacketed). The material is in poor condition and some related debris materials are present on the underlying concrete floor. Access into the steam closets is possible only through a narrow hatch which is kept locked. This space should only be accessed by authorized personnel.

3. asbestos-containing materials:

i. Asbestos-containing vinyl floor tile and associated mastic materials are widespread throughout the level. All vinyl flooring materials and mastic should be considered to be asbestos-containing materials until testing has been conducted by OEHS.

ii. Asbestos-containing tar/mastic is present in several locations on nonasbestos-containing fiberglass lagging which insulates chilled water piping. This material is present primarily above drop ceilings and is considered .

iii. Asbestos-containing adhesive and vibration joint cloth materials are common on ductwork seams and connections throughout ceiling spaces.

iv. Asbestos-containing tar/felt water-proofing materials are present above drop ceilings on the north wall bordering the Phase I Construction Area.

The above-listed materials are considered and should not pose a significant exposure hazard unless physically altered in such a manner (sanding, grinding, pulverization etc.) as to render them friable.

C. Level B1:

1. Accessible friable asbestos-containing materials: Service Chase (B2-050): Thermal pipe insulation: steam supply lines; The above-listed friable asbestos-containing materials were in very good condition at the time of the last visual inspection (February 2005). The area is considered safe for university staff to conduct routine maintenance activities, however, nonroutine tasks with the potential for disturbing the asbestos-containing materials within the area should only be conducted by properly trained and protected personnel.

2. Inaccessible friable materials: Southeast Steam Riser Shaft: Thermal pipe insulation, debris material. The asbestos-containing pipe insulation within the shaft is exposed (unjacketed). The material is in poor condition and some related debris materials are present on the underlying concrete floor. Access into the steam closets is possible only through a narrow hatch which is kept locked. This space should only be accessed by authorized personnel.

3. asbestos-containing materials:

i. Asbestos-containing vinyl floor tile and associated mastic materials are widespread throughout the level. All vinyl flooring materials and mastic should be considered to be asbestos-containing materials until testing has been conducted by OEHS.

ii. Asbestos-containing tar/mastic is present in several locations on nonasbestos-containing fiberglass lagging which insulates chilled water piping. This material is present primarily above drop ceilings and is considered .

iii. Asbestos-containing adhesive and vibration joint cloth materials are common on ductwork seams and connections throughout ceiling spaces.

iv. Asbestos-containing tar/felt water-proofing materials are present above drop ceilings on the north wall bordering the Phase I Construction Area.

The above-listed materials are considered and should not pose a significant exposure hazard unless physically altered in such a manner (sanding, grinding, pulverization etc.) as to render them friable.

D. 1st – 12th Floor, Research Floors:

1. Inaccessible friable materials: Southeast Steam Riser Shaft (1st – 3rd floors only): Thermal pipe insulation, debris material. The asbestos-containing pipe insulation within the shaft is exposed (unjacketed). The material is in poor condition and some related debris materials are present on the underlying concrete floor. Access into the steam closets is possible only through a narrow hatch which is kept locked. This space should only be accessed by authorized personnel.

2. asbestos-containing materials:

i. Asbestos-containing vinyl floor tile and associated mastic materials are widespread throughout the level. All vinyl flooring materials and mastic should be considered to be asbestos-containing materials until testing has been conducted by OEHS.

ii. Asbestos-containing tar/mastic is present in several locations on nonasbestos-containing fiberglass lagging which insulates chilled water piping. This material is present primarily above drop ceilings and is considered .

iii. Asbestos-containing adhesive and vibration joint cloth materials are common on ductwork seams and connections throughout ceiling spaces.

iv. Asbestos-containing tar/felt water-proofing materials are present above drop ceilings on the north wall bordering the Phase I Construction Area.

E. Penthouse Level

The available information from past inspections conducted by outside consulting firms and in-house studies does not indicate the presence of asbestos-containing materials within the Phase III construction of the penthouse level.

F. Exterior/Roof Areas

Exterior areas of the structure, including all roof sections, were been thoroughly surveyed in conjunction with three recent in-house inspections: "Sanger Hall East Exterior Wall Replacement" dated August 15, 1996, "Sanger Hall Roof: Asbestos Testing" dated October 13, 1998, and "Sanger Hall Exterior, Spandrel/Window Replacement", dated October 1, 1999. The above-listed inspection reports are maintained on file within the OEHS Asbestos Database. The combined information provided by these reports indicates that the following materials located within the listed exterior areas of Sanger Hall are asbestos-containing:

1. Roof: Asbestos-containing materials have been abated from the rubber membrane-covered roof sections located on the west and southwest section of the main (lower) roof. The following asbestos-containing materials remain:

a. Flashing materials, perimeter and penthouse wall/roof connections, and at all penetration points.

b. Caulking materials, all joints and seams.

2. Exterior areas:

a. Window glazing and caulk materials, were abated during the window stabilization project, c. 2003-4.

b. Waterproofing materials, beneath brick facade, throughout;

c. Columnar and coping caulk, throughout.

The above-listed materials are considered non-asbestos containing and should not pose a significant exposure hazard unless physically altered in such a manner (sanding, grinding, pulverization etc.) as to render them friable.

Stephen Putney House

Exterior caulking and roof mastics are the only known asbestos-containing building materials. The extent of friable/nonfriable asbestos-containing materials within the structure is not currently known – renovation projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Strauss Laboratory

Pending inspection/record review, known ACM includes vinyl floor tile/mastic (extensive, laboratory surfaces (benchtops and fume hood casings), and limited amounts of mudded fittings and mechanical insulations. Renovation/maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Tomkins-McCaw Library

Extensive abatement projects conducted from the mid-1990s to present have removed friable asbestos-containing materials from nearly all accessible locations. Asbestos-containing lay-in panels, once common throughout much the building have been removed and replaced with non-asbestos containing materials. Asbestos-containing acoustical plaster ceilings within the first floor reference reading room and adjoining offices have also been thoroughly abated.

A. Remaining Accessible Friable Materials:

1. Plaster: The only remaining area of accessible friable asbestos is an approximate 10 sq. ft. section located in the 1st floor stairwell leading up to the second floor study rooms. This material was in very good condition at the time of the last walk-through inspection (circa July, 2010).

2. Pipe Insulation: Asbestos pipe insulation materials are common in the “old” building section (above ceilings, in storage areas, in mechanical areas). Overall the pipe insulation was in very good condition at time of last visual reconnaissance (July, 2010).

B. Inaccessible Friable Materials: Acoustical plaster located high above the drop ceilings of the second floor study rooms (old building section) is assumed to be asbestos-containing. Access into these ceiling spaces should be conducted by properly trained/protected personnel only.

C. Materials: Asbestos-containing vinyl floor tile/associated mastic materials are common throughout much of the facility.

Virginia Mechanics Institute

Generally the flooring found throughout is asbestos-containing. Large recent abatement projects circa 2004 – 2011 have removed extensive areas of vinyl asbestos tile and mastic from the third and fourth floors of the structure (refer to asbestos database for complete information). Accessible pipe insulation throughout the first through fourth floors of the structure are nonasbestos-containing. The basement mechanical room should be assumed to contain asbestos materials until sampled.

Virginia Treatment Center

Generally all accessible friable asbestos-containing building materials were abated, c. 1995-96. Some friable materials may still be present within inaccessible building areas (wall space, chases, bulkheads, etc.) Vinyl floor tile (9 x 9) and associated mastic materials found throughout have been determined to contain asbestos.

Warner Hall

a. Friable Materials: Asbestos inspections conducted circa. 1997 ("MCV Low-Rise Dormitories, Renovation") indicates that the only friable materials present are mudded fittings on domestic and heating system piping. The levels of asbestos detected were from trace to very low concentrations, pipe fittings are sparse and generally in very good condition. Damaged fittings should be reported immediately to VCU Student Housing or OEHS if observed. Contact OEHS before conducting any maintenance or renovation activities which may damage or otherwise disturb the mudded fittings.

b. Materials:

i. Flooring: Past inspection has revealed that vinyl floor tile and associated mastic throughout the structure is asbestos containing.

ii. Exterior/Roofing Materials: Flashing materials on portions of the roof are known to be asbestos containing. Prior to disturbing any roofing, window caulking/ putty/glazing materials contact the VCU Student Housing office and OEHS for clearance.
Pending inspection/record review

West Hospital

Restricted Areas:

1. Ceilings spaces: throughout (ACM: fireproofing/overspray, pipe insulation). Do not access area unless cleared by OEHS.

2. Pipe chases, wall spaces: throughout (ACM: fireproofing/debris, pipe insulation). Do not access area unless cleared by OEHS.

This structure contains many areas which may present significant asbestos exposure hazards to personnel who do follow proper asbestos safety procedures. The most significant exposure risk is presented by spray-applied asbestos-containing fireproofing materials which are widespread above suspended ceilings and within inaccessible areas (pipe chases, wall spaces, brick courses, crevices, penetrations etc.) throughout the structure.

In addition to fireproofing materials, West Hospital contains many other asbestos-containing building materials including: thermal pipe insulation, transite materials, mechanical insulation, vinyl floor tile/mastic, roofing materials, laboratory counter tops, sink backing materials and several other building products. Asbestos-containing pipe insulation materials also present a significant exposure hazard within extensive areas of the building. Due to the effects of aging, as well as water and contact damage the asbestos-containing pipe insulation materials are continually degrading. While much of the exposed asbestos-containing pipe insulation has been removed, it is critical that remaining materials be monitored and repaired regularly to avoid deterioration to a highly friable condition. O & M repairs performed quarterly (or as needed) by the VCU Asbestos Abatement Team within the steam tunnel sections (primary corridors) have vastly reduced asbestos exposure threats within the subbasement since the program was implemented (circa 2000). If damaged suspect pipe insulation materials are encountered contact OEHS (828-4404) as soon as possible so that necessary repair/removal operations can be arranged.

West Hospital Clinic has undergone numerous asbestos abatement projects since the mid 1980's. The scope and quality of past abatement projects was highly variable, sometimes resulting in incomplete removal and residual asbestos contamination in areas which should have be thoroughly abated. Due to this fact, VCU policy is to consider all ceiling areas and inaccessible spaces throughout the structure to be asbestos contaminated (unless clearly designated as a "clean" area within this text): OEHS must be contacted prior to engaging in any construction/maintenance activities with the potential for disturbing asbestos containing materials within these areas. Care must also be taken to avoid damaging pipe insulation and other suspect materials which may be asbestos containing: contact OEHS to determine status of any suspicious material(s) prior to disturbing them. Fortunately, the vast majority of friable asbestos-containing materials (fireproofing, pipe insulation et.al.) within the structure are enclosed behind suspended ceilings, permanent ceilings, masonry walls and other effective barriers, limiting staff exposure potential. Due to the amount of friable asbestos-containing materials involved it is critical that the integrity of these barriers be maintained and that unauthorized access into contaminated spaces be avoided. In order to ensure the effectiveness of the existing barriers, OEHS conducts semi-annual air monitoring (via PCM and TEM analytical methods) and visual

inspections of the entire building. To date air monitoring data has not indicated asbestos levels above the OSHA established Action Level of 0.10 fibers/cc, or the EPA recognized "Clean Air" level of 0.01 fibers/cc. The O & M air monitoring results and the observations made during visual inspections indicate that the existing barriers are currently providing adequate protection between occupied areas and areas of asbestos contamination. Results from the most recent round of O & M air monitoring and surveillance are provided in Appendix E.

A. Subbasement Level: The primary exposure threat within the subbasement level is related to extensive amounts of asbestos-containing pipe insulation. While fireproofing materials were never applied to ceiling surfaces on this level, nearly all steam, hot water and domestic water piping was covered with asbestos-containing pipe insulation. OEHS's files indicate that significant asbestos hazards may exist in the following subbasement areas:

1. Shops, offices and other occupied spaces: heavily damaged asbestos-containing pipe insulation materials and related highly friable debris are common above suspended drop ceilings and permanent ceilings. Ceiling spaces should not be accessed without notification to/approval from OEHS. asbestos-containing materials in these areas may also include vinyl floor tile/associated mastic, duct sealant, vibration joint cloth, and transite materials.

2. Crawl spaces and mechanical rooms: the exposed asbestos-containing pipe insulation materials within these areas have been affected by numerous partial removal and repair operations. While these areas are currently considered safe for access by maintenance and engineering staff, personnel entering the spaces must avoid disturbing asbestos-containing pipe insulation - and should be on the lookout for damaged suspect materials. If damaged suspect materials are encountered, leave the area immediately and contact OEHS.

3. Steam Tunnel: asbestos-containing pipe insulation materials within the subbasement steam tunnel and corridor areas are inspected and repaired quarterly by the VCU Asbestos Abatement Team as part of the university O & M Program. Most of the pipe insulation within the steam tunnels has been identified as "asbestos containing" or "nonasbestos containing" through labels applied by OEHS. However, if any doubt exists as to the asbestos status of suspect materials within these areas, do not disturb until OEHS has conducted a complete investigation.

B. **Basement Level**: Asbestos-containing fireproofing originally applied to ceilings in the rotunda and east wing was removed from all accessible surfaces during the "West Hospital/A. D. Williams Basement Renovation" project, circa 1994, and the "West Hospital Basement Elevator Lobby Abatement" circa 1995 (see Database for complete documentation). This project also addressed other asbestos-containing materials throughout much of the basement level. The south and west wings were further abated in conjunction with the "West Hospital Child Care Area Renovation", circa 1996, 1997 (see Database for complete documentation). The most significant

remaining exposure threats within the basement level are presented by the following areas:

1. Wall spaces, brick courses, riser shafts and pipe chases: may contain highly friable asbestos-containing pipe insulation, fireproofing and/or debris from both materials. These areas should not be penetrated or otherwise accessed without receiving prior clearance from OEHS.

2. Ceiling spaces: asbestos-containing pipe insulation materials are still present above ceilings in isolated areas of the basement. Considering this fact OEHS strongly advises that it be contacted prior to accessing any ceiling area.

3. Throughout: materials with low potential for damage/exposure risk. Vinyl flooring and associated mastic materials common throughout the level should be considered to be asbestos containing. Overall the asbestos-containing flooring materials are in very good condition, thus the related exposure risk is minimal without the occurrence of a physical disturbance (sawing, grinding, cutting, pulverization et.al.). Maintenance and construction activities with potential for disturbing the asbestos-containing flooring and mastic should be avoided until the effected materials can be removed or protected. Other potential asbestos-containing materials on the level include: vibration joint cloth, duct mastic/adhesive materials, window glazing/caulking/putty and sink backing materials. Each of the above listed suspect materials should be assumed to be asbestos containing until verification is received from OEHS.

C. **First Floor**: Although asbestos-containing fireproofing materials were not originally applied to ceiling areas within the west wing Employee Health areas, migration of asbestos fibers from adjacent highly contaminated ceiling areas is possible. To date no measures have been taken to isolate the west wing ceiling from the adjacent
asbestos-contaminated ceiling spaces (migrating fiber sources); for this reason the west wing has been included with the following list of asbestos hazard- restricted areas:

1. Friable Asbestos Hazard Areas (Restricted Access)

a. West, North and East wing ceiling spaces: access restricted, potential for asbestos-containing dust.

b. Rotunda ceiling space: access restricted, condition unknown assume asbestos contamination;

c. Three Bears, ceiling space: access restricted, potential asbestos contamination.

d. Throughout, pipe chases, riser shafts, wall spaces, brick courses: access restricted throughout 1st Floor, heavy asbestos contamination and associated significant exposure hazards present.

Based on OEHS's sampling and visual inspection data, only the spaces above suspended ceilings in the South Wing and associated offices are considered be safe for general access. Please note, however, that wall spaces throughout the 1st Floor-including the South Wing are considered restricted areas of potential asbestos hazard. When working on this level all wall spaces, pipe chases and brick courses should be treated as being asbestos contaminated. Proper university protocol is to contact OEHS prior to disturbing any inaccessible area, so that necessary inspection and testing can be performed. All vinyl floor tile and associated mastic materials (extensive throughout) should also be considered to be asbestos containing throughout the level.

2. Materials: Vinyl flooring and associated mastic materials common throughout the level should be considered to be asbestos containing. Overall the asbestos-containing flooring materials are in very good condition, thus the related exposure risk is minimal without the occurrence of a physical disturbance. Other potential asbestos-containing materials on the level include: vibration joint cloth, duct mastic/adhesive materials, window glazing/caulking/putty and sink backing materials. Each of the above listed suspect materials should be assumed to be asbestos containing until confirmation is received from OEHS.

D. **Second through Sixteenth Floors**: Significant asbestos-related health hazards are effectively enclosed behind suspended/permanent ceilings and wall structures which serve as barriers between contaminated areas and occupied spaces. The **second floor,** East, and West wings were abated of all known friable asbestos spray on fireproofing, a small amount of pipe insulation remains in the west wing Northwest area. Wall chases that are original to the structure in hallways areas should be considered asbestos contaminated.

1. Friable Asbestos Hazard Areas (Restricted Access)

a. Ceiling spaces, throughout (include all wings and rotunda): access to entire area restricted to properly trained/protected personnel due to widespread presence of highly friable asbestos-containing spray-applied fireproofing, pipe insulation and related dust/debris materials.

b. Wall spaces, pipe chases, riser shafts and brick courses: access or penetration of these areas is restricted to properly trained/protected personnel due to widespread presence of highly friable asbestos-containing spray-applied fireproofing, pipe insulation and related dust/debris materials.

2. Other Friable Materials: The following areas contain friable materials with the potential for damage:

a. North Stairwell: pipe insulation materials, canvass wrapped and currently in good condition, exposure risk minimal unless disturbed.

b. HVAC Room: pipe insulation materials, canvass wrapped and currently in good condition, exposure risk minimal unless disturbed. Removal or repair of the above-listed asbestos-containing materials should only be conducted by properly trained/protected personnel.

3. Materials: Vinyl flooring and associated mastic materials common throughout the level should be considered to be asbestos containing. Overall the asbestos-containing flooring materials are in very good condition, thus the related exposure risk is minimal without the occurrence of a physical disturbance. , duct mastic/adhesive materials, window glazing/caulking/putty and sink backing materials. Each of the above listed suspect materials should be assumed to be asbestos containing until verification is received from OEHS.

E. **Seventeenth Floor:** Pipe insulations are found sporadically throughout this floor.

F. **Exterior:** Window caulking and glazing was sampled and determined to be asbestos-containing. Generally roof mastics have been determined to be asbestos-containing.

Wood Memorial Building

Limited survey information is available. Past inspections have indicated that vinyl floor tile/associated mastic, laboratory counter tops, fume hood casing, pipe insulation, mudded pipe fittings, mechanical insulation, (window caulking/glazing – all windows abated and replaced, Spring 2005), and roofing materials (flashing/mastics and silver paint have been sampled and do contain asbestos).

Extensive amounts of asbestos-containing pipe insulation materials are known to be sporadic in mechanical rooms; but common in ceiling spaces, within pipe chases, wall spaces, and bulkheads. Renovation/maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Zeigler House

Limited sampling indicates 12” floor tile is positive, Linoleum is negative. Limited sampling was performed only on the first floor. The remainder of the structure remains unknown pending further sampling. Renovation/maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

VIRGINIA BIOTECHNICAL CENTER

Biotech One

OEHS considers this structure to be asbestos free: asbestos-containing materials are not suspected to be present within this structure.

Biotech Two

OEHS considers this structure to be asbestos free: asbestos-containing materials are not suspected to be present within this structure.

Biotech Three

Asbestos information not available, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Biotech Four

Asbestos information not available, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

MONROE PARK CAMPUS

1310-1312 West Main St./Transportation Safety Training Center

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

1314 West Main St./Rehabilitation Research Training Center

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

1315 West Floyd St./Dance and Choreography Building

Hard wall plaster was sampled and determined to be negative for asbestos on the first floor only, for the remainder of the structure insufficient information on file. Renovation/maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

6 South Cherry St./VCU Community Police Office

Insufficient information on file, pending inspection and review. Renovation/maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

916 West Franklin St./Millhiser Carriage House, Rear

Interior window glazing, hard wall plasters on both levels and blown in attic insulation have been sampled, all are negative for asbestos. For the remainder of the structure insufficient information on file. Renovation/maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

938-44 West Grace St./VCU Police Building

Limited file information exists for this structure. It appears to have been completely renovated prior to VCU purchasing. Exterior window caulking and interior wallboard and joint compound material have been sampled, both were determined to be negative for asbestos. Renovation/maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Ackley Residence Center (1100 West Broad St.)

Building constructed circa 2002, no asbestos-containing materials are known to be present.

Adkins House, 824 Park Avenue

Building abated/razed circa 2002, VCU dining building was constructed on the site, however, historic data available in OEHS asbestos database.

Alumni House (New) 924 West Franklin St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Alumni House (Old) 310 North Shafer Street

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Anderson Gallery, 907 1/2 West Franklin St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Anderson House, 913 West Franklin St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Archaeology Research Center, 1355 West Broad St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Biggs Building (Fine Arts), 900 West Marshall St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Bird House, 820 West Franklin St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Blanton House, 826-28 West Franklin St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Bocock House, 909 West Franklin St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Bowe House, 917 West Franklin St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Buford House, 922 West Franklin St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Facilities Management, 6 South Linden St.

Building abated/razed circa 1998, historic data available in OEHS asbestos database. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Facilities Management, 1000 West Franklin St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Facilities Management, 1014 West Franklin St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Cary St Annex, 917 Green Alley

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Business Building, 1015 Floyd Avenue

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Business Building Auditorium, 1015 North Linden St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Cary St. Field

Athletic field: No known asbestos hazards.

Cary St. Gymnasium, 911 West Clay St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Child Care Center, 1028 Floyd St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Dance Center, 10 North Brunswick St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Education Annex, 109 North Harrison St.

Building fully abated and razed circa 2011. Historical records are maintained in OEHS asbestos database.

Engineering Building/Va. Microelectronics Center, 601 West Main St.

Building constructed circa 1996, no asbestos-containing materials are known to be present.

Finance (Flowers) Building, 327 North Main St.

Building fully abated and razed during fall of 2005. Historical records are maintained in OEHS asbestos database.

Fine Arts Center, 1016 West Broad St.

Building constructed circa 2003, no asbestos-containing materials are known to be present.

Founders Hall, 827 West Franklin St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Franklin St Gymnasium, 817 West Franklin St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Franklin Terrace, 812-14 West Franklin St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

General Purpose Academic Building, 901 West Main St.

Building constructed circa 1992, no asbestos-containing materials are known to be present.

Ginter House, 901 West Franklin St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Gladding Residence Center, 711 West Main St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Grace St. Theater, 934-36 West Grace St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Harrison House, 816 West Franklin St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Hibbs Building, 900 Park Ave.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Hunton House, 810 West Franklin St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Internal Audit Building, 944 West Grace St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Jack Thompson Furniture 1224 West Broad St.

Building fully abated and razed during project occurring 2001 through 2001. Historical records are maintained in OEHS asbestos database.

James Branch Cabell Library, 901 Park Ave.

Update: The asbestos-containing acoustical plaster ceiling that was formerly exposed in the main lobby of the first floor was fully abated in 2002.

I. Basement Level: Past inspections of the building (Hall-Kimbrell report, circa 1987, Fire Safety Upgrades Inspection, 1994) have indicated that the vast majority of the asbestos-containing materials on the basement level are . Nearly all of known friable asbestos-containing materials on the floor level were concentrated within the main mechanical room. The mechanical room received an extensive amount of asbestos abatement in 1996 in association with "Cabell Library Boiler

Repair Project". Nearly all of the friable asbestos-containing materials were removed during this project. An assessment of existing asbestos hazards as of 11/11/05 is provided below:

A. Friable Materials

1. Mechanical Rooms:

a. Mudded joint fittings (on fiberglass insulated lines), widespread;

b. Pipe insulation, isolated, limited sections.

The asbestos-containing mudded pipe fittings and pipe insulation are canvass wrapped, and were in very good condition at the time of the last visual inspection (12/99) and should not pose a significant exposure hazard unless physically disturbed.

2. Above drop ceilings:

a. Mudded joint fittings.

The asbestos-containing mudded pipe fittings and pipe insulation are canvass wrapped, and were in very good condition at the time of the last visual inspection (12/99) and should not pose a significant exposure hazard unless physically disturbed.

B. asbestos-containing materials: Asbestos-containing vinyl floor tile and associated mastic materials are widespread throughout the level. These materials are considered and should not pose a significant exposure hazard unless physically altered in such a manner (sanding, grinding, pulverization etc.) as to render them friable. All vinyl flooring materials and mastic should be considered to be asbestos-containing materials until testing has been conducted by OEHS. Asbestos-containing adhesive and vibration joint cloth materials are common on ductwork seams and connections throughout ceiling spaces. These materials are considered and should not pose a significant exposure hazard unless physically altered in such a manner (sanding, grinding, pulverization etc.) as to render them friable. Other asbestos-containing materials may include: boiler/valve gaskets, elevator door interiors (assumed), fire doors; all door interiors should be considered asbestos containing until tested/cleared by OEHS.

II. First through Fourth Floors

A. Friable Asbestos-Containing Materials:

1. Above Drop Ceilings: Mudded pipe fittings, these materials are in very good condition, and unless disturbed do not pose an exposure hazard.

2. Pipe Chases: -Mudded pipe fittings, these materials are in very good condition, and unless disturbed do not pose an exposure hazard.

B. Asbestos-Containing Materials: Asbestos-containing vinyl floor tile and associated mastic materials are widespread throughout all levels. These materials are considered and should not pose a significant exposure hazard unless physically altered in such a manner (sanding, grinding, pulverization etc.) as to render them friable. All vinyl flooring materials and mastic should be considered to be asbestos-containing materials until testing has been conducted by OEHS. Asbestos-containing adhesive and vibration joint cloth materials are common on ductwork seams and connections throughout ceiling spaces. These materials are considered and should not pose a significant exposure hazard unless physically altered in such a manner (sanding, grinding, pulverization etc.) as to render them friable. Additional asbestos-containing materials may include: linoleum flooring, elevator door interiors, and fire doors; all door interiors should be considered asbestos containing until tested/cleared by OEHS.

III. Building Exterior: A complete abatement of the roof was conducted in 1997 (documentation is available in the OEHS asbestos database under: "Cabell Library - Roof Asbestos Abatement", circa 1996-1997). Remaining asbestos-containing materials on the building exterior may include: window glazing, caulking, and putty, on all windows units and framework. Each of the above-listed materials is considered and should not pose a significant exposure hazard unless physically altered in such a manner (sanding, grinding, pulverization etc.) as to render them friable. Operations with the potential of creating such a disturbance of these asbestos-containing materials should only be conducted by licensed, properly trained/protected personnel.

Johnson Hall, 901 West Franklin St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Kearney House, 921 West Franklin St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Lafayette Hall, 312 North Shafer St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Life Sciences (Trani) Building, 6 South Linden St.

Building constructed circa 2000, no asbestos-containing materials are known to be present.

Life Sciences Building (Old) 816 Park Ave.

Building fully abated and razed circa 2002. Historical records are maintained in OEHS asbestos database.

Lindsey House, 600 West Franklin St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

McAdams House, 914 West Franklin St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Meeting Center, 101 North Harrison St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Metropolitan Health Center, 700 West Grace St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Military Science, 6-8 North Harrison St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Millhiser House, 916 West Franklin St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Music Center 1015 Grove Ave.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Oliver Hall Education Wing, 1015 West Main St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Oliver Hall Physical Science Wing, 1001 West Main St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Parking (Academic Deck), 801 West Main St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Parking CV Deck

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Parking, West Broad Deck

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Performing Arts Center, 922 Park Ave.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Physical Plant Storage Building

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Pollak Building, 825 North Harrison St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Presidents House, 910 West Franklin St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Raleigh Building, 1001 West Franklin St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Rhoads Hall, 710 West Franklin St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Ritter-Hickok House, 821 West Franklin St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Scherer Hall, 923 West Franklin St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Shafer Street Playhouse, 221 North Shafer St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Sitterding House, 901 Floyd Ave.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Social Work, 102-106 North Linden St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Sports Medicine Building, 1225 W. Broad St.

Building constructed circa 2001, no asbestos-containing materials are known/suspected to be present.

Stagg House 912 West Franklin St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Stark House, 915 West Franklin St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Stokes House, 918 West Franklin St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Stuart Siegel Center, 1200 West Broad St.

Building constructed circa 2000, no asbestos-containing materials are known/suspected to be present.

Thalhimer Tennis Courts, 7 South Linden St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Thurston House, 808 West Franklin St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

University Student Commons, 907 Floyd Ave.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Valentine House, 920 West Franklin St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

West Grace St. Student Housing (701 West Grace St.)

The limited available survey information indicates that exposed spray-applied asbestos-containing ceiling plaster is present in extensive areas of upper floors. The material was in good condition at the time of the last limited visual inspection (August 2012) and should not pose a significant exposure threat unless disturbed.

Elsewhere in the structure vinyl asbestos floor tile and associated mastic are widespread, and mudded joint packings (elbows) on fiberglass pipe insulation are also suspected to be asbestos containing. Clearance form OEHS must be attained prior to disturbing any of the above-listed asbestos-containing materials or other suspect materials (roofing materials, window glazing/caulking, sheetrock, mechanical insulation, sink backing materials, duct mastic, etc.).

Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

White House, 806 West Franklin St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Williams House, 800 West Franklin St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

Younger House, 919 West Franklin St.

Insufficient information on file, pending inspection and review. Renovation/ maintenance projects with potential for disturbance of asbestos-containing materials should be preceded by a thorough asbestos inspection.

APPENDIX C

RENOVATION/MAINTENANCE ACTIVITY NOTIFICATION FORM

VCU Renovation/Maintenance Activity Notification, request for approval:

Date of request:_____

Department:_____

Contact:_____

Phone #:_____

Building affected:_____

Area affected (be specific):

Proposed task(s) (be specific):

Proposed date(s) of activity:_____

The above-listed task(s) shall not be conducted prior to receiving written verification from OEHS. Submit completed forms to OEHS via university mail or e-mail (David Patterson: drpatter@hsc.vcu.edu).

APPENDIX D

MODEL UNIVERSITY ASBESTOS ABATEMENT SPECIFICATIONS

This document is to provide criteria regarding asbestos removal activities at the referenced location(s) of the VCU/MCV complex. The abatement contractor shall follow the terms set forth in this specification during all phases of abatement conducted on the grounds of VCU/VCUHS.

I. Project Meeting

1. Pre-Bid Walk Through Meeting:

   The pre-bid walk-through meeting shall be held in accordance with the "Notice of Invitation To Bid" as specified in the Project Manual.

2. Periodic Project Meetings:

   The owner and /or the project monitor reserves the right to schedule meetings with a representative of the contractor during the course of the project to discuss project activities, assist in staying on schedule, etc.

II. Testing

Collection of all OSHA required air monitoring will be conducted as per all applicable State and Federal regulations and shall be the sole responsibility of the contractor. The laboratory to be used must be qualified to perform the NIOSH Method 7400, have an established quality control program, and, in all respects, conform to the requirements under the OSHA standard.

III. Qualifications of Contractor and Contractor's Personnel

As required by governing regulations, the contractor must be licensed by the Commonwealth of Virginia, as an asbestos abatement contractor. All workers on the project must be licensed asbestos abatement "workers". There must also be a licensed asbestos abatement "supervisor" on the job site at all times during the course of asbestos work.

IV. Information to be Submitted after Contract is Awarded

Submit the following information to the owner/project manager for review:

1. Bidders must demonstrate experience on asbestos abatement projects by the submission of a list of three (3) previous asbestos removal projects; names, addresses, and phone numbers of purchasers of service; location of projects; dates projects were performed.

2. An officer of the company must sign a statement containing the following information:

   a. Record of any citations issued by Federal, State or Local regulatory agencies relating to asbestos abatement activity. Projects, dates, and resolutions must be included.

   b. Situations in which an asbestos-related contract has been terminated including projects, dates, and reason(s) for termination.

c. Listing of any asbestos-related legal proceeding/claims in which the contractor (or employees scheduled to participate) are currently involved. Included descriptions of role, issue, and resolution to date.

3. The contractor must submit a summary of his training program and/or a list of EPA approved training certification courses that his employees have attended (include name of course and presenter of the course).

4. The contractor must submit a summary of his written respiratory protection program which is in compliance with OSHA regulations. A copy of this program shall be made available to the owner and/or industrial hygienist upon request.

5. The contractor must have an established medical surveillance program in compliance with 29 CFR 1926.1101. A statement must be submitted that all personnel participate in a medical surveillance program.

6. Provide the name, training and/or certification of the air-monitoring supervisor.

7. Immediately upon award of the contract, and before any work has commenced, the contractor shall submit for the information of the owner and project manager (one copy each) the data listed below.

   a. Name and address of the laboratory to be used in air sample analysis.

   b. Proposed location of the decontamination unit. (This is subject to approval by the project monitor).

   c. Name/location of the EPA approved sanitary landfill used for disposal of asbestos waste materials.

   d. Manufacturer's technical data sheets on proposed surfactant, encapsulant, and mastic remover.

   e. Certificate of insurance (or a copy of policy) with notarized statement thereon that all requirements stated in the Project Manual (General Conditions).

ASBESTOS REMOVAL PROJECT DESIGN

GENERAL CONDITIONS:

I. SUMMARY OF THE WORK:

The work covered by this specification consists of furnishing all labor, supplies, materials, and equipment to perform asbestos removal services in conjunction with the following project:

Virginia Commonwealth University,
Building,
Project Description,
Project Number,
Asbestos Abatement
Project Date

The project involves the removal/repair of asbestos-containing materials from areas of the following structure:.. Specific instructions regarding asbestos removal/repair scope of work and work methods are provided on the asbestos removal drawing(s) titled: "…"

Virginia Commonwealth University,
Campus,
Building,
Specific Location/Address

II. GENERAL TERMS:

A. General Definitions

ACM: Asbestos-Containing Material(s).

AGGRESSIVE SAMPLING: High-activity level air sampling which results in settled asbestos remaining airborne and uniformly distributed through the use of special entrainment and mixing techniques. This makes any settled asbestos fibers accessible to the sampling filters for subsequent detection.

AMENDED WATER: Water containing a wetting agent or surfactant.

ANSI: American National Standards Institute.

ASBESTOS: The term asbestos includes Chrysotile, Amosite, Crocidolite, Tremolite, and Actinolite.

AREA MONITORING: Sampling of asbestos fiber concentrations within the asbestos control area which is representative of the airborne concentrations of asbestos fibers which may reach the breathing zone.

CLEAN ROOM: An uncontaminated room having facilities for the storage of employees' street clothing and uncontaminated materials and equipment.

CONTRACTOR: Refers to the person, firm, or corporation providing the goods and services for this sub-contract - "Asbestos Removal Project Design."

DECONTAMINATED AREA: An enclosed area adjacent and connected to the regulated area and consisting of an equipment room, shower area, and a clean room which is used for the decontamination of workers, materials and equipment contaminated with asbestos.

D.O.T.: Department of Transportation.

ENCAPSULATION: The coating of asbestos-containing materials with a bonding or sealing agent to prevent the release of airborne fibers.

EPA: United States Environmental Protection Agency

Dirty Room (CHANGE ROOM): A contaminated room located within the decontaminated area that is supplied with impermeable bags or containers for the disposal of contaminated protective clothing and equipment.

FRIABLE ASBESTOS MATERIAL: Material that contains more than 1% asbestos by weight and that can be crumbled, pulverized or reduced to powder by hand pressure when dry.

HEPA FILTER EQUIPMENT: High efficiency particulate air filtered vacuuming equipment and negative air machines with a filter system capable of collecting and retaining asbestos fibers. Filters shall be 99.97 percent efficient for retaining particles and fibers with a minimum dimension of 0.3 micrometers or larger.

NIOSH: National Institute for Occupational Safety and Health.

OSHA: United States Occupational Safety and Health Administration and the Virginia Occupational Safety and Health Division of the Department of Labor and Industry.

OWNER: The agent with the authority to execute the contract for the state agency.

PERMISSIBLE EXPOSURE LIMIT (PEL): An airborne concentration of asbestos in excess of 0.1 fibers per cubic centimeter of air as an eight (8) hour time-weighted average (TWA), using the OSHA mandatory analytical procedure specified in 29 CFR 1926.1101, Appendix A.

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PROJECT MONITOR: Means the individual(s) representing the "owner" to make inspections, conduct monitoring, observe progress, approve schedules, and accept services under the terms of the contract.

III. GENERAL REQUIREMENTS:

A. The contractor shall furnish all labor, materials, supplies, and equipment necessary to remove and dispose of all asbestos-containing material (ACM).

B. All work shall be performed in full compliance with all applicable EPA, OSHA, and DOT regulations, NIOSH recommendations, all other applicable Federal, State and Local government regulations, and the specifications contained herein.

IV. SPECIFIC REQUIREMENTS:

A. Regulations

1. The contractor shall comply with all EPA, OSHA, DOT, and Commonwealth of Virginia Regulations and will follow EPA and ANSI workplace guidelines. Pertinent OSHA standards are the applicable section of 29 CFR 1910 and 29 CFR 1926, including but not limited to 29 CFR 1910.1001, 1910.139, 1910.1200, and 1926.1101. EPA workplace guidelines include "Asbestos-Containing Materials in School Buildings", and 40 CFR Part 61, Subparts A and B, except where there are differing specifications. In this event, the most stringent specifications shall govern.

2. The contractor shall remove, transport, and dispose of the asbestos from the job site in compliance with all EPA regulations, and in accordance with these specifications. The contractor shall be responsible for obtaining the approval of the waste disposal site, and for manifesting all waste disposed of at this facility.

3. The contractor shall have a copy of the pertinent OSHA standards, EPA regulations, and CERCLA waste spill phone numbers at the job site and shall make them available upon request.

B. Permits and Notifications

The contractor will secure the necessary permits in conjunction with asbestos removal, hauling and disposal and provide timely notification of such actions as may be required by Federal, State, Regional and Local authorities. Notification will be sent to the Department of Labor and

Industry-Division of Occupational Safety and Health, USEPA Region III and the agency Asbestos Coordinator 20 days prior to commencement of work. Copies of all permits and notifications will be provided to the owner and project monitor.

C. Water and Electricity

Generally water and electricity will be made available by the owner for construction use. Any temporary electrical connections shall be the responsibility of the contractor and performed by a licensed electrician. All temporary electrical connections shall be pre-approved by the owner (Project Manager or other owner-designated representative).

D. Construction Shower Facilities

The contractor is to provide shower facilities.

E. Removal of Non-Stationary Items from the Work Area

All non-stationary items (i.e. furniture) will be removed from the work area by the owner before the contractor begins work. An exception to this will be items found to be contaminated with asbestos fibers; contaminated items will be left in the work area to be HEPA vacuumed and/or wet-wiped by the contractor. Such items will be identified before bids are received.

F. Existing Building

The contractor shall provide proper protection of all existing building materials, furnishings, and fixtures which remain and may be damaged.

G. Work Site Damages

1. The owner/project manager shall hold the contractor responsible for any damage to the building and the contents, including fixed equipment, resulting from leakage or spillage of water, or from any other intentional or negligent acts or omissions.

2. Any damage to the structural integrity of the ceilings and walls of each work area (other than specified demolition) shall be repaired by the contractor at his own expense and replaced with materials of equal or better quality. Damage repairs and replacement of materials are to be approved by the owner/project manager prior to project completion.

3. The contractor shall be responsible for any asbestos fiber contamination of adjoining areas and/or properties which occur as a result of the asbestos abatement activities. All equipment and/or materials within these areas and/or properties shall be totally decontaminated or disposed of and replaced by the contractor with equipment and/or materials of equal or better quality at the contractor's expense (pending approval of owner/project manager).

H. General Cleaning

Contractor shall keep premises and building free from accumulations of waste materials or rubbish caused by the contractor's employees or employees of the subcontractor. At the completion of the work, the contractor shall remove all rubbish, tools, scaffolding, and surplus materials from the work site. The work site shall be left clean and habitable.

I. Information to be Submitted Upon Acceptance/Completion of the Project

1. Two copies (one to the owner and one to the industrial hygienist) of all air monitoring results from samples taken for this project shall be submitted. All results shall be presented as signed "Certificates of Analysis", and must include:

   -- Date sampled
   -- Volume sampled and/or flow rate/sample time
   -- Location (building, floor, room, area within room) for area air samples or name of individual for personal samples
   -- Activity occurring during sampling (removal, cleaning, etc.)
   -- Concentration of fibers (reported as fibers/cc)

2. Two copies (one to the owner and one to the project monitor) of the waste manifest shall be submitted. The manifest must be signed as accepted by the sanitary landfill and the manifest must also state the waste was generated by the facility.

V. ASBESTOS ABATEMENT

A. Personal Protection

1. Powered air purifying respirators equipped with NIOSH approved HEPA filters and/or Class "C" supplied air respirators, shall be used for the duration of the removal project, unless a change has been approved by the project designer and/or engineer. Supplied air quality shall be certified Grade D breathing air or better from a certified air source. If mastic removal products are to be utilized, workers shall be provided with appropriate respiratory protection as required by OSHA and as indicated by the manufacturer.

2. Supplied air respirator systems must include a back-up provision approved for maintaining air flow long enough for escape and decontamination from a contaminated atmosphere in the event of loss of the primary source of breathing air.

3. Workers shall wear properly fitted respirators in the work area. Long side-burns, beards, etc., which interfere with proper fit are unacceptable.

4. Workers shall wear disposable, full body coveralls, gloves, disposable head covers, and disposable footwear in the work area.

5. Respirators shall be sanitized daily by the contractor or between shifts if employees share usage.

6. Eating, drinking, smoking, and chewing of gum or tobacco shall not be permitted in the work area, equipment room or shower area.

7. All individuals, without exception, shall wear an approved respirator, disposable coveralls, gloves, head cover, and footwear to enter the work area. Personal clothing worn into the containment area will not be transferred out until it is properly sealed within two separate six (6) mil asbestos disposal bags.

B. Establishing the Decontamination Unit

1. The contractor shall establish a decontamination unit to include an equipment room, clean room, and a shower outside each work area. The decontamination unit shall be continuous with the work area. The area shall include a clean room connected by a double poly barrier to a walk-through shower, which is also connected, by a double poly barrier to an equipment room. There will also be a double poly barrier separating the equipment room and the work area.

2. The clean room will contain boxes or lockers for each worker's street clothes. The contractor will provide these.

3. Portable showers must be used. No "facsimile" showers will be allowed, (i.e., hose put through a poly slit with poly flooring).

4. Soap, shampoo, disposable towels, etc., shall be provided by the contractor.

5. The decontamination unit chambers are to be cleaned daily.

6. The clean room, shower, and equipment room must be sealed completely to ensure that the sole source of airflow through these areas originates from uncontaminated areas outside the asbestos removal, demolition, or renovation enclosure. The shower must be drained and filtered to retain particles 5.0 microns or larger, after each use to ensure that contaminated water is not released to uncontaminated areas. If waste is inadvertently released, it shall be cleaned up as soon as possible to prevent any asbestos in the water from drying and becoming airborne in areas outside the work area.

7. All workers shall use the following procedure. Remove street clothes in the clean room and put on the coveralls and all other protective equipment before entering the work area. Before exiting the work area all coveralls, head covers, boots, etc., shall be cleaned with a HEPA vacuum and removed. The respirator shall be properly fitted and provide an effective seal. Hoods, associated with disposable garments, shall be worn on the outside of the respirator-no clothing shall be permitted on the head and neck area beneath the respirator. After completely disrobing with the exception of respirators, the workers shall proceed to the shower room. Under the shower, respirators shall be rinsed thoroughly then removed and cleaned. Used filters shall be placed in suitable plastic bags on the contaminated side of the shower, sealed, and labeled for disposal. All boots, shoes, etc., will remain in the equipment room until the project is completed when they will be bagged and moved to the next asbestos removal project as contaminated equipment or disposed of as asbestos waste. At no time are they to be worn through the shower to the clean room or outside of the containment area.

C. Work Area Preparation

1. Heating, Ventilation, and Air Conditioning (HVAC)

   a. The contractor shall notify the owner /project manager, project monitoring consultant, and project designer at least five days in advance of project commencement so that the owner may make the necessary modifications to the HVAC system.

   b. The contractor shall be responsible (coordinate with owner) for ensuring that the HVAC system is isolated for the asbestos removal work area. There will be a "tagging" process to ensure that the system is not activated until the completion of the project.

   c. The contractor shall cover/isolate the HVAC duct grills (return and supply) inside the work area with three separate layers of 6 mil polyethylene sheeting. Each layer shall extend a few inches above the first layer and be sealed with duct tape.

   d. The isolation of the HVAC system will be inspected and approved by the project monitor before the project can proceed.

2. Electrical System Isolation

   a. The contractor shall notify the owner at least five days in advance of project commencement so the owner will ensure that the electrical system within the asbestos removal project area has been properly isolated and "tagged".

   b. The contractor will be responsible for "hooking up" to the building's electrical system in order to provide electrical services. All temporary electrical connections will be approved by the project manager prior to energizing.

3. Clean and Remove Non-Stationary Items from the Work Area

   All non-stationary items (i.e., furniture) which have been pre-determined to be contaminated with asbestos fibers, will be HEPA vacuumed and/or wet-wiped to remove any asbestos-containing dust. The individuals conducting the cleaning shall wear respiratory protection and disposable clothing. Once this has been accomplished, all non-stationary items will be removed from the work area or covered properly to prevent further contamination.

4. Seal Stationary Items

   Items not being removed from the work area (i.e., large machinery, water fountains, etc.) shall be wet-wiped and/or HEPA vacuumed, and then sealed with two layers of 6 mil fire retardant polyethylene and duct tape.

   Electrical outlets shall be covered with two layers of 6 mil polyethylene and duct tape.

5. Tape and Seal Windows with Fire Retardant Polyethylene

   a. The edges of all windows shall be sealed with duct tape. Once the edges are sealed,

the windows shall be covered with two layers of 6 mil fire retardant polyethylene and duct tape.

b. Windows which will serve as outlets for the negative air machine exhaust shall be boarded with plywood. The plywood shall be cut to proper dimensions to allow enough room for the negative air machine duct to exhaust to the outside of the building. The exhaust duct shall be secured to the plywood by with duct tape.

6. Isolating Access Areas/Critical Barriers

a. All access areas (i.e., doors, halls, etc.) which are not part of the work area shall be sealed off from public access. All doors, halls, or other areas not directly needed for work place access, shall be sealed with plywood barriers and then covered with a minimum of two layers of 6 mil fire retardant polyethylene.

b. The owner may choose to padlock boarded access doors in areas where security is a concern.

7. Sealing All Penetrable Areas

All penetrations of the floor, walls and ceilings shall be sealed with a minimum of two layers 6 mil fire retardant polyethylene and duct tape to prevent airborne asbestos from escaping into the area outside the work area or from lodging in cracks around the penetration.

8. Covering the Work Area with Fire Retardant Polyethylene

A minimum of two layers of 6 mil fire retardant polyethylene sheeting shall be used to cover the work area floors. Spray adhesive and duct tape shall be used to seam sheets of polyethylene together. The floor covering shall be cut to proper dimensions (12" overlap, or greater) to extend up the wall all the way around the room. The polyethylene floor covering shall be flexible enough to prevent damage from foot traffic.

After the first floor layer has been secured, a second layer shall be installed with the seams of the first and second layers offset. The second layer of polyethylene shall extend at least 12 inches above the first layer on the wall and be secured with duct tape.

After covering stationary objects and the floors, two layers of 6 mil fire retardant polyethylene shall be used to cover the walls. The sheets of polyethylene shall be hung from the top of the wall, 2 inches below the asbestos material and shall be long enough to overlap the floor sheets by approximately twenty-four inches. The vertical sheets shall be overlapped and seam-sealed with adhesive duct tape.

It may be necessary in some instances to use nails and wood blocks to secure the polyethylene when duct tape cannot support the weight of the polyethylene (as when humidity is excessive). The contractor shall reinforce the containment structure as needed to provide proper negative pressure-gross containment conditions.

9. Emergency and Fire Procedures

a. The contractor shall establish emergency and fire procedures for evacuation. Emergency and fire procedures shall have priority over decontamination procedures.

b. The contractor shall have arrows marking the exits and fire extinguishers on site.

D. Negative Air Pressure Within the Enclosure

1. After construction of the enclosure is complete, a ventilation system shall be installed by the contractor to create a negative pressure within the enclosure with respect to the area outside the enclosure. This system must be equipped with HEPA filters meeting specifications established in ANSI Standard 29.2-79. The system shall be required to produce a negative pressure of 0.04 inches of water column within the enclosure. The system must provide at least six (6) air changes per hour.
Negative air exhaust will not be vented into the building(s).

2. The negative pressure system shall be operated in accordance with Appendix J., pages J-1 through J-8, of the EPA Guidance Manual No EPA 560/85-024, entitled "Recommended Specifications and Operating Procedures for the Use of Negative Pressure Systems for Asbestos Abatement".

3. If during the removal process negative pressure is not maintained in the work area, all removal operations shall be immediately suspended. The owner and project monitor shall be notified immediately.

E. Removal Process

1. The removal process shall begin once the work preparations have been finished, inspected, and approved.

2. The contractor shall have a licensed "supervisor" on the job at all times to ensure that the enclosure and employees are in compliance with all governing regulations and these specifications. The "supervisor" shall ensure that unauthorized personnel do not enter the enclosure and that all employees that do enter the enclosure observe proper protection and decontamination procedures.

3. Proper work practice is important in asbestos abatement. All asbestos-containing materials shall be thoroughly wetted with amended water to enhance penetration prior to removal. Once the wetting process has taken place, removal can begin.

4. At the beginning of each work day, all polyethylene barriers must be checked to ensure that they are still intact. All corrections (if applicable) will be made before any other work practices begin.

5. Upon removal, the asbestos material shall be thoroughly wetted again and placed directly into waste bags. Asbestos shall not accumulate on the floor before bagging. Bags shall not be dropped or thrown but placed carefully by hand.

6. The waste bags shall be properly sealed immediately after filling.

7. Once the bulk of the material has been removed, efforts can be directed toward cleaning operations.

F. Cleaning Operations

1. Once the bulk of material has been removed, the substrate shall be thoroughly brushed, then wet-wiped with amended water.

The following steps shall be performed in sequential order:

2. All surfaces shall be thoroughly wet-wiped, allowed to dry, and then wet-wiped again.

3. Rags and water used for wet wiping shall be continually changed. Rags shall be disposed of as asbestos-contaminated wastes and the water poured through the shower filtration system (treated as asbestos waste).

4. The outer layer of polyethylene shall be wet, cut, folded inward as it is removed, and bagged as asbestos waste.

5. The top (outer) floor layer of the equipment room shall be removed along with the top (outer) floor of the work area to ensure that tracking of asbestos dust does not occur from this area.

6. Any visual debris which might leak behind the outer layer of poly shall be removed by HEPA vacuuming and/or wet-wiping.

7. Removal of gross contamination from all equipment in the work area will take place once the top layer has been removed. The negative air filters will be changed at this time.

8. Equipment will be wet-wiped, washed off in shower and removed from work area (except negative air machines). Tools such as scrapers, utility knives, brushes, etc., will be sealed in plastic and transported to other jobs.

9. Once a thorough visual inspection has been conducted by the project monitor, lock down of the area will begin. An approved encapsulant material is to be applied to the substrate, ductwork, etc.

10. Once the encapsulant has been applied, a period of twenty-four (24) hours must elapse to allow the encapsulant to dry.

11. Following the twenty-four (24) hour waiting period, satisfactory air clearance monitoring and final visual inspection, removal of the inner (bottom) polyethylene layers will take place.

12. All floors will be wet-mopped. All walls will be wet-wiped.

13. All critical barriers, decontamination unit, windows, HVAC system, electrical outlets, penetrations, and negative air machines will be left in place until the project has been given final approval by the project monitor.

G. Clearance Proceedings

1. Once all stages of preparation, removal, and clean-up have been completed satisfactorily, clearance proceedings will begin.

2. Clearance proceedings will consist of an air-sampling scheme developed by the project

monitor.

3. All air samples taken by the project monitor for the owner will be analyzed by an accredited laboratory selected by the project monitor.

4. All air samples for the owner shall be analyzed by either phase-contrast microscopy, NIOSH Method 7400 at an accredited laboratory, or Transmission Electron Microscopy at an accredited laboratory.

5. The project monitor reserves the right to conduct surface dust samples for possible asbestos contamination using microvacuuming, wipe sampling, and/or tape lifting techniques. All surface dust samples will be analyzed by an accredited laboratory using the polarized light microscopy with dispersion staining technique.

H. Project Acceptance

1. Project clearance will be based on thorough visual inspections conducted by the project monitor.

2. The project monitor's air monitoring results will be the samples used for clearance decisions.

3. Once the criteria for clearance established in H-1 and H-2 has been met, the project monitor will inform the owner of project completion.

4. If the criteria for clearance established in H-1 have not been fulfilled to the satisfaction of the project monitor, then re-cleaning of the entire removal area will be required until desired results are achieved. Additional charges for re-inspections and testing by the owner will be deducted from the contractor's final payment.

I. Inspections

1. The project monitor shall conduct inspections throughout the project. Each step of the abatement project will require his inspection/approval before proceeding to the next step.

2. Environmental and clearance sampling will be conducted by a project-monitoring firm retained by the owner, or by the owner.

3. Materials and workmanship shall be subject to examination by the project monitor at all times during the construction and use of the asbestos containment. The project monitor shall have authority to reject defective material and workmanship and require its correction.

4. The project monitor will immediately suspend any work which is being conducted in an unsafe manner, i.e., the potential for personal injury or property damage exists.

5. The project monitor shall ensure that the contractor and their employees are licensed by the Commonwealth of Virginia.

J. Air Monitoring

1. Collection of all OSHA required air sampling shall be conducted by a competent representative of the contractor. Sampling and analysis costs shall be borne by the

contractor.

2. Air monitoring samples shall be analyzed by a microscopist who has successfully completed the NIOSH 582 course - Sampling and Evaluating Airborne Asbestos Dust.

3. All analytical results will be posted at the work site entrance within forty-eight (48) hours of sampling. Results shall be designated as to sample type (area or personal) and location.

4. If fiber contamination outside the containment is found to be in excess of 0.01 fibers/cc, the contractor shall immediately stop work and notify the building manager and project monitor. Work will not be resumed until corrective action has been engaged.

5. The project monitor may conduct air sampling at critical barriers other than those designated to the contractor.

K. Labeling

1. The contractor shall post signs and ensure labels are affixed to all asbestos materials, scrap, waste, debris, etc. Signs shall be posted at all entrances to the work area.

2. The signs and labeling shall be of sufficient size to be clearly legible, and display the following:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD

L. Waste Disposal

1. Asbestos debris shall be placed in a 6-mil bag within the enclosure and sealed. Upon removal from the enclosure, the bags shall be rinsed and placed into a second, clear 6-mil bag.

2. Each asbestos waste bag shall be labeled with the above identified warning sign along with all other pertinent information (including waste generator and generation site) in accordance with applicable federal and state regulations.

3. All asbestos waste bags shall be removed from the work area and stored in a properly prepared hauling container following the completion of each shift.

4. Sharp objects (i.e. ceiling grid work) shall be bagged and placed into a labeled, fiber drum for disposal.

5. Asbestos shall be disposed of at an approved landfill.

6. A manifest must accompany the asbestos waste and shall be signed by a responsible representative of the landfill.

7. Transportation of asbestos waste for disposal must be in accordance with all Federal, State,

Regional, and Local standards.

8. If a temporary disposal receptacle (dumpster) is to be utilized, the following conditions must be met:
    a. The receptacle shall be fully covered.
    b. Warning signs shall be placed on each side of the receptacle.
    c. The receptacle shall be locked when not attended.

9. Workers unloading asbestos at the disposal site shall wear NIOSH approved respirators with HEPA filters. Bags must be carefully unloaded by hand and placed on the ground.

10. An enclosed or covered vehicle must be used to transport asbestos to the disposal site.

11. Copies of disposal manifests must be submitted to the project manager within 60 days of the landfill receipt date.

M. Removal Via Mini-enclosure

Small scale-short duration abatement tasks (cleaning surfaces for wall and ceiling penetrations, drilling of holes, installing mounting for conduit etc.) may be performed under mini-enclosure conditions with the preapproval of the Project Designer.

1. Mini-enclosure construction and work methods shall follow the guidelines established in 29 CFR 1926.1101 Appendix G.

2. Respiratory Protection: Powered air purifying respirators with NIOSH approved HEPA cartridges shall be the minimum allowable form of respiratory protection for the duration of the project.

3. The project monitor shall perform a visual inspection on each mini enclosure prior to completion/removal of unit. The project monitor may also choose to conduct clearance sampling prior to granting final clearance. Airborne fiber counts less than .01 f/cc would be required prior to achieving final clearance.

N. Removal Via Negative Pressure Glove-Bags:

1. Removal of asbestos-containing materials via negative pressure glove-bag techniques (as specified in these documents and in OSHA 29 CFR 1926.1101) may be performed only in areas preapproved by project designer.

A minimum negative pressure differential of less than 0.02 inches of water column (as opposed to ambient air) shall be maintained within glove-bags throughout asbestos removal operations.

All glove-bag set-up and asbestos removal activities shall be performed by two workers wearing powered air-purifying respirators (PAPRs) equipped with NIOSH-approved HEPA cartridges. Workers performing asbestos removal via glove-bag shall also don disposable protective coveralls and gloves.

Areas to be affected by glove-bag removal of asbestos-containing materials shall be thoroughly precleaned utilizing wet-wiping and HEPA-vacuuming equipment. At least one layer of 6 mil polyethylene will be used under each glove bag as a drop cloth.

All glove-bags must be preinspected by the project monitor prior to beginning asbestos removal.

Workers shall thoroughly wet asbestos-containing materials prior to, and during asbestos removal activities. A wetting agent shall be utilized if water repelling asbestos-containing materials are encountered.

Each individual glove-bag unit must be inspected and granted visual clearance by the project monitor prior to tear-down.

8. All interior areas of each glove-bag shall be thoroughly encapsulated prior to tear down.

O. Removal of Asbestos-Containing Flooring Materials

1. Removal of asbestos-containing flooring and mastic materials shall be performed under negative pressure gross containment conditions as specified unless written permission is obtained from the project designer approving the use of nondestructive removal methods.

2. Nondestructive or "Armstrong" removal methods shall be permitted on a case-by-case basis only in locations where quantities of asbestos-containing floor tile and/or mastic to be abated total 10 square feet or less.

3. Nondestructive or "Armstrong" removal of asbestos-containing floor tile and mastic shall be performed in accordance with the procedures outlined in the texts "Recommended Work Procedures For Resilient Floor Coverings" 1980/1987, and "Resilient Floor Tile, Asphaltic 'Cutback' Mastic, Sheet Vinyl Flooring, Instructions for Removal", June 1993, issued by the Resilient Floor Covering Institute, 966 Hungerford Drive, Suite 12-B Rockville Maryland, 20850. Failure to follow the procedures as presented in the above listed texts shall result in the return to negative pressure gross containment conditions and/or work stoppage.

4. Workers performing the removal of all asbestos-containing flooring materials shall don proper PPE as specified in section V (Asbestos Abatement) of these specifications, regardless of whether removal is performed via gross containment conditions or through nondestructive.

5. Construction activities with the potential for disturbing asbestos-containing flooring materials (drilling and/or driving of nails through asbestos-containing flooring materials et.

al.) shall be performed by properly trained and protected personnel in accordance with these specifications.

P. Roof Abatement Plan

1. Full containment of work area is optional.

2. A full three-stage decontamination unit equipped with temperature controllable water source, and HEPA equipped wastewater filtering system shall be constructed immediately contiguous to the work area.

3. Workers shall utilize full face-powered air purifying respirators equipped with NIOSH approved HEPA cartridges throughout abatement activities, unless prior approval given by the project designer/engineer to allow a lesser respirator.

4. All suspect asbestos-containing materials shall be wetted with amended water prior to, and during removal.

5. Use of power tools (i.e., roof saws) shall not be permitted unless the equipment is equipped with HEPA filtering attachments. All power tools must be approved by the Office of Environmental Health and Safety prior to use on this project.

6. Polyethylene sheeting of 6 mil thickness shall be placed on all exterior areas lying directly below the work area. The sheeting shall extend a minimum of 15' feet outward from the base of the effected building (where conditions permit).

7. The contractor shall designate areas of potential hazard through the use of caution barrier tape and signage. All precautions shall be taken to protect pedestrians from falling debris and potential asbestos exposure.

8. Full or partially filled asbestos waste bags and all debris generated during removal operations shall be removed at the termination of each work shift. Dropping or throwing waste bags from the work area to the ground, or into receptacles staged on the ground shall be strictly forbidden.

9. All waste bags shall be of 6 mil thickness bearing proper labeling as identified previously in these specifications.

10. All ladders, scaffolding and other fall protection equipment utilized throughout the project shall comply with all applicable federal and state and local regulations.

VI. Asbestos Abatement Drawing/Removal Notes

A. Asbestos Removal Drawing (Specifications required to provide detailed removal drawing(s) detailing location of asbestos to be abated)

B. Asbestos Abatement Drawing - Removal Notes (Notes describing specific conditions affecting asbestos removal to be provided in specification package)

APPENDIX E

OPERATIONS & MAINTENANCE ANNUAL AIR MONITORING RESULTS

2011 Annual O & M Air Monitoring Results

VCU OPERATION AND MAINTENANCE (O&M) AIR SAMPLE RESULTS FOR 2011

BUILDING NAME	SAMPLE DATE	SAMPLE LOCATION	TIME ON	TIME OFF	SAMPLING RESULTS *, ++
FOUNDERS HALL	12/15/2011	BASEMENT RECORDS ROOM	7:00AM	9:00 AM	<0.002
FOUNDERS HALL	12/15/2011	BASEMENT RECORDS ROOM #10	7:00AM	9:00AM	<0.002
WEST HOSPITAL	12/13/2011	18th FLOOR IN ELEVATOR ROOM	10:30 AM	12:30 PM	0.007
WEST HOSPITAL	12/13/2011	17TH FLOOR, SOUTH WING	10:30 AM	12:30 PM	0.005
WEST HOSPITAL	12/14/2011	16TH FLOOR, ROTUNDA	9:30 AM	11:30 AM	0.004
WEST HOSPITAL	12/14/2011	15TH FLOOR, ROTUNDA	9:35 AM	11:35 AM	0.003
WEST HOSPITAL	12/15/2011	14TH FLOOR, ROTUNDA	8:45 AM	10:45 AM	0.003
WEST HOSPITAL	12/15/2011	12TH FLOOR, ROTUNDA	8:50 AM	10:50 AM	0.003
WEST HOSPITAL	12/16/2011	11TH FLOOR, EAST WING	8:00 AM	10:00 AM	0.003
WEST HOSPITAL	12/16/2011	10TH FLOOR, ROTUNDA	8:05 AM	10:05 AM	0.002
WEST HOSPITAL	12/20/2011	9TH FLOOR, ROTUNDA	9:20 AM	11:20 AM	<0.002

WEST HOSPITAL	12/20/2011	8TH FLOOR, NORTH WING	9:25 AM	11:25 AM	<0.002
WEST HOSPITAL	12/20/2011	7TH FLOOR, NORTH WING	11:55 AM	1:55 PM	0.003
WEST HOSPITAL	12/20/2011	6TH FLOOR, NORTH WING	11:55 AM	1:55 PM	<0.002
WEST HOSPITAL	12/21/2011	5TH FLOOR, WEST WING	8:10 AM	10:10 AM	<0.002
WEST HOSPITAL	12/21/2011	4TH FLOOR, NORTH WING	8:15 AM	10:15 AM	0.002
WEST HOSPITAL	12/21/2011	3RD FLOOR, SOUTH WING	10:30 AM	12:30 AM	0.003
WEST HOSPITAL	12/21/2011	2ND FLOOR, NORTH WING	10:40 AM	12:40 PM	<0.002
WEST HOSPITAL	12/22/2011	1ST FLOOR, NORTH WING	8:00 AM	10:00 AM	<0.002
WEST HOSPITAL	12/22/2011	BASEMENT, NORTH WING	8:10 AM	10:10 AM	0.002
WEST HOSPITAL	12/22/2011	SUB-BASEMENT, ROTUNDA	12:00 PM	2:00 PM	<0.002
VCU STEAM PLANT	12/15/2011	OFFICE AREA	7:30 AM	9:30 AM	0.003
VCU STEAM PLANT	12/15/2011	OFFICE AREA	7:30 AM	9:30 AM	<0.002

**** SAMPLE RESULTS ARE IN FIBERS PER CUBIC CENTIMETER OF AIR: F/CC.***

++ ALL SAMPLES ARE BELOW EPA BASELINE CLEARANCE CRITERIA OF 0.01 F/CC.