SECTION 00913 - ADDENDUM NUMBER 3

PARTICULARS

1.01 DATE: June 3, 2013

1.02 PROJECT: UNIVERSITY OF SOUTH CAROLINA - COKER 7TH FLOOR PHARMACY RENOVATIONS

1.03 PROJECT NUMBER: State Project #H27-6101, A/E #12023.01

1.04 OWNER: University of South Carolina

1.05 ARCHITECT: GMK Associates, Inc.

TO: PROSPECTIVE BIDDERS

2.01 This Addendum forms a part of the Contract Documents and modifies the Bidding Documents dated April 23, 2013, and Addendum Number 1 issued May 22, 2013, and Addendum Number 2 issued May 28, 2013 with amendments and additions noted below.

2.02 Acknowledge receipt of this Addendum in the space provided in the Bid Form. Failure to do so may disqualify the Bidder.

2.03 This Addendum consists of 3 pages and the following attachments:

A. SECTION 02080 - ASBESTOS ABATEMENT (FME CONSULTANTS)

B. SECTION 11531 - LABORATORY FUME HOODS

C. DRAWING M1.7

D. DRAWING AB-1 (FME CONSULTANTS)

CLARIFICATIONS

3.01 Supply and installation of the fume hoods is by Contractor. The specifications for the fume hoods are included in this addendum.

3.02 Supply and installation of the break room kitchen equipment is by Owner.

3.03 Q. Spec section 01100 Summary paragraph 1.04B states that Owner has awarded contract for demolition and abatement of asbestos containing material. It was our understanding that abatement would be part of the contract. Please clarify.

A. Demolition and abatement of asbestos containing material is by Contractor. The scope of work is included in this addendum.

3.04 Q. Spec section 01500 Temporary Facilities paragraph 1.12D says use of the elevator limited to 5am – 7am and 1.12.G says debris shall not be removed during normal building hours. There was talk of designating one elevator for the contractor. Please clarify when elevators can be used and when debris may be removed from the building.

A. Addendum No. 2 removed time constraints from the Work other than Substantial and Final completion. The haul route was indicated as well. An elevator will be designated for Contractor use.

CHANGES TO THE PROJECT MANUAL

4.01 SE-310 REQUEST FOR ADVERTISEMENT

A. The bid closing date and time are changed as follows: June 11, 2013 at 1:00 PM.

4.02 SECTION 02080 - ASBESTOS ABATEMENT

A. Add this section in it's entirety.

4.03 SECTION 11531 - LABORATORY FUME HOODS

A. Add this section in it's entirety.

4.04 SECTION 12352 - WOOD LABORATORY CASEWORK

A. 2.03 C.: Add: Wood species - Red Oak, with vertical grain matching.

B. 2.03 G.: All exposed cabinet hardware is to be stainless steel.

CHANGES TO THE DRAWINGS

5.01 DRAWING A1.8:

A. Keyed Floor Plan Notes:
   1. Add Note 5: VERIFY WATERTIGHT INTEGRITY OF REMOVED CABLE TIE-DOWNS AND RE-SEAL IN PLACE WHERE PRACTICAL OR REMOVE AND PATCH ROOF WHERE REQUIRED.

5.02 DRAWING A2.7:

A. Keyed Floor Plan Notes:
   1. Add Note 5: REPAIR DAMAGES FROM REMOVED CONSTRUCTION AND REPAINT EXISTING PARTITIONS. PAINT TO MATCH EXISTING COLOR OR NEW COLOR AS DIRECTED BY OWNER.

5.03 DRAWING M1.7

A. Replace the existing drawing with the attached revised drawing in it's entirety.

5.04 DRAWING AB-1 (FME CONSULTANTS)

A. Add this drawing in it's entirety.

APPROVAL OF ADDITIONAL PRODUCTS/SYSTEMS

6.01 Specification SECTION 12351 - METAL LABORATORY CASEWORK

A. Mott Manufacturing is an approved manufacturer.

B. CiF Lab Solutions is an approved manufacturer.

6.02 Specification SECTION 12352 - WOOD LABORATORY CASEWORK

A. Mott Manufacturing is an approved manufacturer.

B. Cabinets by Design is an approved manufacturer.

C. CiF Lab Solutions is an approved manufacturer.

D. Campbell Rhea is an approved manufacturer.

END OF SECTION

SECTION 02080 - ASBESTOS ABATEMENT

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

A. Documents affecting work of this Section include, but are not necessarily limited to, abatement design drawing AB-1 and the asbestos analytical reports provided by USC's HAZMAT personnel, located in the appendix of these specifications.

1.2 ASBESTOS ABATEMENT CONTRACTOR QUALIFICATIONS:

A. Asbestos Abatement Contractor's Qualifications:

1. A qualified firm that has not less than five (5) years' experience in the removal and proper disposal of asbestos-containing materials (ACM).

1.3 SCOPE OF WORK – SUMMARY

A. The scope of work for the asbestos abatement generally includes the removal and proper disposal of asbestos-containing materials (ACM) within the project limits as indicated on the provided drawings and referenced in these specifications.

B. Abatement Contractor (Contractor) will be required to coordinate with the General Contractor (GC) regarding all abatement activities associated with the project included herein.

C. Contractor and GC shall coordinate general demolition activities that will not impact ACM within the building with those that will either require or potentially impact ACM.

D. Prior to commencement of abatement activities, Contractor shall submit required documents as outlined in Section 1.16 herein.

E. Contractor shall remove ACM utilizing work practices outlined by the USEPA's and the SCDHEC's regulations.

F. The Contractor shall refer to abatement plans for locations and limits of abatement activities.

G. Contractor shall thoroughly clean areas where abatement activities are to occur prior to establishing containment or performing abatement work.

H. Contractor shall coordinate removal of non-ACM suspended ceiling systems throughout the all areas of the abatement with GC to accommodate abatement work tasks.

I. In the event of a fiber release (airborne or amended water), Contractor will follow procedures as outlined in Section 3.2, part A of these specifications.

J. The Contractor shall be responsible for verification of all quantities.

K. Estimated quantities of asbestos-containing materials (ACM) to be removed and/or impacted during the abatement operations shall include the following:

1. Sheet vinyl floor and associated adhesive (3,100 SF Est.)
2. Duct mastic on seams of fiberglass duct wrap insulation (300 SF Est.)
3. Mastic on seams of metal ductwork (150 SF Est.)
4. Roofing materials (200 SF Est.)
5. Transite panels in laboratory fume hoods (10 Units)
6. Laboratory sinks (22 Units)

L. ABATEMENT ACTIVITIES

The following is a summary of the scope of abatement activities required during the abatement operations. More detailed information regarding materials, execution, etc. are provided in other sections herein and abatement plan AB-1. Please note that the mechanical systems shown on plan AB-1 are a general schematic depiction of the existing HVAC components.

7th Floor Abatement Activities:

Abatement activities include the friable removal of asbestos-containing vinyl flooring materials, as well as non-friable mastic on fiberglass duct wrap, mastic on seams of metal ductwork, and transite panels associated with fume hoods and sinks associated with laboratory countertops. Contractor shall coordinate with GC the removal of non-ACM suspended ceiling systems to access ductwork for abatement activities. Contractor shall also coordinate all abatement activities with the GC to ensure that only building components to be removed (i.e. mechanical systems piping and ductwork) as part of the renovation within the project area are removed. Contractor shall ensure that all building components to remain are not removed or damaged.

The Contractor shall remove the following materials from the abatement area of the 7th floor of Coker Life Sciences Building:

1. *Sheet Vinyl Flooring and Associated Adhesives* – Contractor shall remove while under containment sheet vinyl flooring and associated adhesive found in areas shown on drawings and dispose of them as ACM.
2. *TSI, Mastics on Fiberglass Duct Wrap & on Metal Ductwork* – Metal ductwork is located above the ceiling grid. Some branches of ductwork are insulated with fiberglass duct wrap, while others are uninsulated. Seams of both the fiberglass duct wrap and the uninsulated metal ductwork are sealed and coated with asbestos-containing mastics. Contractor shall remove all mastics, associated fiberglass duct wrap insulation and all metal ductwork and dispose of as ACM. Non-friable removal methods may be utilized during this process, provided the proper care is taken to protect surrounding areas and workers.
3. *Transite Panels (Fume Hoods)* – Existing fume hoods within the project area on the 7th floor are lined with Transite panels. Contractor is to remove these fume hoods as a function of the

abatement. Contractor shall disassemble and remove fume hoods without damaging the Transite panels located inside the hoods. The panels shall be handled and disposed of as ACM. Non-friable removal methods may be utilized during this process, provided the proper care is taken to protect surrounding areas and workers, to include provision of a negative exposure assessment (NEA) to Owner for the non-friable method to be used. Please note that the removal of screws from the Transite panels during disassembly is considered to be a friable abatement without appropriate NEA documentation of this method.

4. *Laboratory Sinks* – Contractor is to be aware that existing laboratory countertops throughout the renovation area are non-ACM. However, the associated sinks are Transite and shall be removed and handled as ACM. Contractor may dismantle lab countertops and cabinetry to access and remove sinks intact provided the associated Transite is not damaged during this task.

Roof:

1. Contractor shall coordinate and assist GC with all penetrations through the existing roof and removal of roofing materials as required for the removal of existing mechanical systems and installation of the new roof-mounted HVAC unit, as well as alterations to the existing structural components of the roof. All materials shall be removed, handled and disposed of as ACM.

2. Contractor shall refer to Mechanical Drawing M1.7 Partial Roof Plan for locations of activities associated with the renovations to mechanical systems on the roof.

1.4 CONTRACTOR'S DUTIES – SUMMARY

A. The Contractor is to provide and pay for the following, except as specifically noted:

1. Labor, material, tools, required equipment (i.e. scaffolding, *etc.*) and machinery.

2. Other facilities and services necessary for proper execution and completion of Work.

3. Pay legally required sales, consumer and use taxes.

B. Contractor will absorb costs for the following:

1. Permits

2. Government fees

3. Licenses

C. Contractor shall provide notifications to appropriate entities based on applicable regulations.

D. Contractor shall comply with codes, ordinances, rules, regulations, orders, and other legal requirements of public authorities which bear on performance of Work.

E. Contractor shall enforce strict discipline and good order among employees. Do not employ on Work, on Project or Work Site:

1. Unfit persons.

2. Persons not skilled in assigned task.

1.5 REFERENCES

A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS

Pub #4545	(1994) OSHA Analytical Methods Manual

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z9.2	(1979; R 1991) Fundamentals Governing the Design and Operation of Local Exhaust Systems
ANSI Z87.1	(1989; Errata; Z87.1a) Occupational and Educational Eye and Face Protection
ANSI Z88.2	(1992) Respiratory Protection

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM E 1368	(1990) Visual Inspection of Asbestos Abatement Projects

CODE OF FEDERAL REGULATIONS (CFR)

CFR 29 Part 1910	Occupational Safety and Health Standards
CFR 29 Part 1926	Safety and Health Regulations for Construction
CFR 40 Part 61	National Emission Standards for Hazardous Air Pollutants
CFR 40 Part 763	Asbestos

ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 340/1-90-018	(1990) Asbestos/NESHAP Regulated Asbestos Containing Materials Guidance
EPA 340/1-90-019	(1990) Asbestos/NESHAP Adequately Wet Guidance

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH)

NIOSH Pub No. 84-100	(1984; Supple 1985, 1987, 1988 & 1990)
NIOSH	Manual of Analytical Methods

UNDERWRITERS LABORATORIES (UL)

UL 586	(1990) High-Efficiency, Particulate, Air Filter Units

1.6 DEFINITIONS

A. Adequately Wet

1. A term as defined in CFR 40 Part 61, Subpart M and EPA 340/1-90-019 that means to sufficiently mix or penetrate with liquid to prevent the release of particulates. If visible emissions are observed coming from asbestos-containing material (ACM), then that material

has not been adequately wetted. However, the absence of visible emissions is not sufficient evidence of being adequately wetted.

B. Aggressive Method

1. Removal or disturbance of building material by sanding, abrading, grinding, or other method that breaks, crumbles, or disintegrates intact ACM.

C. Amended Water

1. Water containing a wetting agent or surfactant with a surface tension of at least 29 dynes per square centimeter when tested in accordance with ASTM D 1331.

D. Asbestos

1. Asbestos includes chrysotile, amosite, crocidolite, tremolite asbestos, anthophylite asbestos, actinolite asbestos, and any of these minerals that have been chemically treated and/or altered.

E. Asbestos-Containing Construction Material (OSHA):

1. Any manufactured construction material that contains more than one tenth of one percent asbestos by weight.

F. Asbestos-Containing Material (ACM)

1. Any material containing more than one percent asbestos

G. Asbestos Regulated Work Area

1. An asbestos regulated work area is an area established by the Contractor to demarcate areas where Class I, II and III asbestos work is conducted, and any adjoining area where debris and waste from such asbestos work accumulate; and a work area within which airborne concentrations of asbestos exceed or there is a reasonable possibility they may exceed the permissible exposure limit.

H. Authorized Person

1. Any person certified and authorized by the Contractor, Owners Representative and/or Owner and required by work duties to be present in regulated areas.

I. Category I Non-friable ACM

1. A term as defined in CFR 40 Part 61, Subpart M and EPA 340/1-90-018 that means asbestos-containing packing, gaskets, resilient floor covering, and asphalt roofing products containing more than 1 percent asbestos as determined using the method specified in CFR 40 Part 763, Appendix A, Subpart F, Section 1, Polarized Light Microscopy.

J. Category II Non-friable ACM

1. A term as defined in CFR 40 Part 61, Subpart M and EPA 340/1-90-018 that means any material, excluding Category I Non-friable ACM, containing more than 1 percent asbestos as determined using the methods specified in Appendix A, Subpart F, CFR 40 Part 763, Section 1, Polarized Light Microscopy, that when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure.

K. Class I Asbestos Work

1. Activities that involve the removal of thermal system insulation (TSI) and surfacing ACM.

L. Class II Asbestos Work

1. Abatement activities involving the removal of ACM, which is not thermal system insulation or surfacing material. This includes, but is not limited to, the removal of asbestos-containing wallboard, floor tile and sheeting, roofing and siding shingles, and construction mastic.

M. Competent Person

1. In addition to the definition in CFR 29 1926.32 (f), one who is capable of identifying existing asbestos hazards in the workplace and selecting the appropriate control strategy for asbestos exposure, and who has the authority to take prompt corrective measures to eliminate them.

N. Critical Barrier

1. One or more layers of 6-mil plastic sealed over all openings into a work area or any other similarly placed physical barrier sufficient to prevent airborne asbestos in a work area from migrating to an adjacent area.

O. Disturbance

1. Contact, which releases fibers from ACM or debris containing ACM. This term includes activities that disrupt the matrix of ACM, render ACM friable, or generate visible debris. Disturbance includes cutting away small amounts of ACM no greater than the amount that can be contained in one standard sized glove bag or waste bag in order to access a building component. In no event shall the amount of ACM so disturbed exceed that which can be contained in one glove bag or waste bag which shall not exceed 60 inches in length and width.

P. Friable ACM

1. A term as defined in CFR 40 Part 61, Subpart M and EPA 340/1-90-018 that means any material containing more than 1 percent asbestos as determined using the method specified in CFR 40 Part 763, Appendix A, Subpart F, Section 1, Polarized Light Microscopy, that when dry, can be crumbled, pulverized, or reduced to powder by hand pressure. If the asbestos content is less than 10 percent as determined by a method other than point counting by polarized light microscopy (PLM), verify the asbestos content by point counting using PLM.

Q. Glove Bag

1. A term as defined by CFR 29 Part 1926.1101 that means a sealed compartment with attached inner gloves used for the handling of asbestos containing materials.

R. Intact

1. ACM which has not crumbled, been pulverized, or otherwise deteriorated so that it is no longer likely to be bound with its matrix.

S. Negative Initial Exposure Assessment

1. A demonstration by the Contractor that employee exposure during an operation is expected to be consistently below the PELs (TWA and Excursion Limit).

T. Non-friable ACM

1. A term as defined in CFR 40 Part 61, Subpart M and EPA 340/1-90-018 that means any material containing more than 1 percent asbestos as determined using the method specified in CFR 40 Part 763, Appendix A, Subpart F, Section 1, Polarized Light Microscopy, that, when dry, cannot be crumbled, pulverized or reduced to powder by hand pressure.

U. Permanent Barrier, Vertical

1. A permanent leak-tight enclosure constructed of metal studs and sheetrock. The permanent barrier walls shall be constructed as detailed herein and shall be air tight and non-combustible.

V. Time-Weighted Average (TWA)

1. The TWA is an 8-hour time weighted average of airborne concentration of fibers (longer than 5 micrometers) per cubic centimeter of air which represents the employee's 8-hour workday as determined by Appendix A of CFR 29 Part 1926, Section 1926.58.

1.7 DESCRIPTION OF WORK

A. The work covered by this section includes the requirements for the removal, transportation, disposal, storage, containment of, and housekeeping activities involving asbestos containing materials and asbestos contaminated materials located within the South Tower. CFR 40 Part 763 governs this abatement work.

1.8 SECURITY

A. Security shall be provided for each asbestos regulated work area. A logbook shall be kept documenting entry into and out of the asbestos regulated work area. Entry into asbestos regulated work areas shall only be by personnel authorized by the Abatement Contractor, Owners Representative and Owner. Personnel authorized to enter asbestos regulated work areas shall be trained, medically evaluated and wear the personal protective equipment, as required by this specification, for the specific asbestos regulated work area to be entered.

1.9 MEDICAL REQUIREMENTS

A. Medical requirements shall conform to CFR 29 Part 1926, Section 1926.58.

1. Medical Examinations

a. The Contractor shall provide medical examinations for all workers who may encounter an airborne fiber level of 0.1 f/cc or greater for an 8 hour time weighted average. In the absence of specific airborne fiber data provide medical examination for all workers who will enter the work area for any reason. Examination shall as a minimum meet OSHA requirements as set forth in 29 CFR 1926.1101(m) and, in addition, provide an evaluation of the individuals' ability to work in environments capable of producing heat stress in the worker.

2. Medical and Exposure Records

a. The Contractor shall maintain complete and accurate records of employees' medical examinations for a period of 30 years after termination of employment as required by 29 CFR 1926.1101(n) and make records of the required medical examinations available for inspection and copying to: The Assistant Secretary for Occupational Safety and Health, The Director of The National Institute for Occupational Safety and Health (NIOSH), authorized representatives of either of them, and an employee's physician upon the request of the employee or former employee.

1.10 TRAINING

A. All Contractor personnel involved with asbestos work must be trained and tested prior to any work, and shall be thoroughly familiar with the Contractor's standard operating procedure for the abatement work. All personnel shall undergo the specific medical examinations required by OSHA. The superintendent and the foreman shall be thoroughly familiar with all applicable regulations and practices for asbestos work and shall have participated in at least two abatement projects of similar size and scope within the past two years. All personnel shall be in possession of valid respirator fit test Paperwork.

1.11 RESPIRATORY PROTECTION PROGRAM

A. The Contractor shall establish in writing, and implement a respiratory protection program in accordance with CFR 29 Part 1926, Section 1926.58, CFR 29 Part 1910, Section 1910.134, ANSI Z88.2, CGA G-7 and CGA G-7.1. The Contractor shall establish minimum respiratory protection requirements based on measured or anticipated levels of airborne asbestos fiber concentrations encountered during the performance of the asbestos abatement work. The Contractor's respiratory protection program shall include, but not be limited to, the following elements:

1. The company policy, used for the assignment of individual responsibility, accountability, and implementation of the respiratory protection program.

2. The standard operating procedures covering the selection and use of respirators. Respiratory selection shall be determined by the hazard to which the worker is exposed.

3. Medical evaluation of each user to verify that the worker may be assigned to an activity where respiratory protection is required.

4. Training in the proper use and limitations of respirators.

5. Respirator fit testing (i.e., quantitative, qualitative and individual functional fit checks).

6. Regular cleaning and disinfection of respirators.

7. Routine inspection of respirators during cleaning and after each use when designated for emergency use.

8. Storage of respirators in convenient, clean, and sanitary locations.

9. Surveillance of work area conditions and degree of employee exposure (e.g., through air monitoring).

10. Regular evaluation of the continued effectiveness of the respiratory protection program.

11. Recognition and procedures for the resolution of special problems as they affect respirator use (e.g., no facial hair that comes between the respirator face piece and face or interferes with valve function; prescription eyewear usage; prohibition of wearing contact lenses; etc.).

12. Proper training in putting on and removing respirators.

1.12 HAZARD COMMUNICATION PROGRAM

A. A hazard communication program shall be established and implemented in accordance with CFR 29 Part 1926, Section 1926.59.

1.13 SAFETY AND HEALTH COMPLIANCE

A. In addition to detailed requirements of this specification, the work shall comply with applicable laws, ordinances, criteria, rules, and regulations of Federal, state, regional, and local authorities regarding handling, storing, transporting, and disposing of asbestos waste materials and with the applicable requirements of CFR 29 Part 1910, CFR 29 Part 1926, CFR 40 Part 61, Subpart A, and CFR 40 Part 61, Subpart M, NFPA 10, NFPA 70, NFPA 90A, NFPA 101. Matters of interpretation of standards shall be submitted to the appropriate administrative agency for resolution before starting work. Where the requirements of this specification, applicable laws, rules, criteria, ordinances, regulations, and referenced documents vary, the most stringent requirement as defined by the Owner shall apply.

1.14 COMPETENT PERSON

A. When the contractor has employees engaged in Class I or II asbestos work, he shall have a Competent Person performing or supervising the following duties, as applicable:

1. Set up the regulated area, enclosure, or other containment;

2. Ensure (by on-site inspection) the integrity of the enclosure or containment;

3. Set up procedures to control entry to and exit from the enclosure and/or area;

4. Supervise all employee exposure monitoring and ensure that it is conducted as required;

5. Ensure that employees working within the enclosure and/or using glove bags wear protective clothing and respirators as required.

6. Ensure through on-site supervision that employees set up and remove engineering controls, use work practices and personal protective equipment in compliance within all requirements;

7. Ensure that employees use the hygiene facilities and observe the decontamination procedures specified;

8. Ensure through on-site inspections that engineering controls are functioning properly and employees are using proper work practices; and,

9. Ensure notification of other employees on site.

1.15 PERMITS, LICENSES AND NOTIFICATIONS

A. The Contractor shall obtain all necessary permits and licenses in conjunction with the project asbestos abatement, transportation and disposal actions and timely notification furnished of such actions required by Federal, state, regional, and local authorities and as otherwise specified herein. The Contractor shall notify the SCDHEC and the Owner in writing at least 10 days prior to the commencement of work in accordance with CFR 40 Part 61, Subpart M, state and local requirements to include the mandatory "Notification of Demolition and Renovation Record" form and other required notification documents. Notification shall be by Certified Mail - Return Receipt Requested. The Contractor shall furnish copies of the receipts to the Owner prior to the commencement of work.

B. The Contractor shall notify the Owner if any of the following occur:

1. If the Contractor or any of its subcontractors are served with notice of violation of any law, regulation, permit or license which relates to this Contract.

2. Proceedings are commenced which could lead to revocation of related permits or licenses.

3. Permits, licenses or other Owner authorizations relating to this Contract are revoked.

4. Litigation is commenced which would affect this Contract.

5. If the Contractor or any of its Subcontractors become aware that its equipment or facilities are not in compliance or may fail to comply in the future with applicable laws or regulations.

1.16 SUBMITTALS

A. The following shall be submitted to the Owner and/or the Owner's Representative **prior to the start of abatement operations**:

1. Manufacturer's catalog data

a. Manufacturer's catalog data for all materials and equipment to be used in the work, including brand name, model, capacity, performance characteristics and any other pertinent information.

2. Asbestos Abatement Work Plan

a. A written Asbestos Abatement Work Plan outlining the project sequencing, methods, etc. must be accepted in writing by the Owners' Representative prior to start of any site work.

3. Safety Plan

a. A written safety plan and comprehensive site-specific accident prevention plan at least 30 days prior to start of work. This plan must be accepted in writing by the Owners' Representative prior to start of any site work.

4. Employee Training and Certification of Worker Acknowledgement

a. Contractor shall submit the following training documentation for each employee to be engaged in the abatement work

i. Copy of certification of accreditation for completion of "workers" course (for workers) or "Contractor/Supervisor" Course (for Contractors and onsite supervisory staff) meeting the requirements of EPA's CFR 40 Part 763 or more stringent state criteria, and all subsequent annual refresher training certificates meeting same requirements.

ii. A copy of a Contractor generated form entitled Certificate of Workers Acknowledgment shall be completed for each employee.

5. Notifications

a. The Owner shall be notified in writing 10 days prior to the start of asbestos work. A copy of the written notification shall be provided to any rental company concerning the intended use of rental equipment and the possibility of asbestos contamination, the decontamination procedures that will be used prior to the return of the equipment. A copy of the rental company's written acknowledgment and agreement shall be included in the submittal.

6. Certificates

a. Vacuum, Filtration and Ventilation Equipment

b. Manufacturer's certifications showing compliance with ANSI Z9.2 for:

i. Vacuums

ii. Water filtration equipment

iii. Ventilation equipment

iv. Other equipment required for containing airborne asbestos fibers.

B. The following shall be submitted to the Owner and/or the Owner's Representative **during or following abatement operations**:

1. Initial Exposure Assessment

a. The Contractor shall ensure that a "competent person" conducts an initial exposure assessment immediately before or at the initiation of all operations to determine expected exposures. The assessment must be based on the competent person's review of all aspects of the Contractor's performance doing similar jobs. Only if similar controls are used and the work supervised by the same or similarly trained personnel, may past data be relied on. The assessment shall include consideration of all observations, information or calculations that indicate employee exposure to asbestos, including any previous monitoring conducted in the workplace, or of the operations of the Contractor that indicate the levels of airborne asbestos likely to be encountered on the job. However, the assessment may conclude that exposures are likely to be consistently below the PELs only as a conclusion of a "negative exposure assessment". The Contractor shall monitor employees at the beginning of the project. The exposure assessment shall be updated to reflect actual conditions based on the results of exposure monitoring.

2. Encapsulant

a. A certificate stating that encapsulant meets the applicable specified performance requirements.

3. Negative Exposure Assessment

a. Using a Negative Exposure Assessment, the Contractor may demonstrate that employee exposures will be below the PELs by data, which conform to the following criteria:

i. Objective data demonstrating that the product or material containing asbestos minerals or the activity involving such product or material cannot release airborne fibers in concentrations exceeding the TWA and excursion limit under those work conditions having the greatest potential for releasing asbestos; or

ii. Where the Contractor has monitored prior asbestos jobs for the PEL and the excursion limit within 12 months of the current or projected job, the monitoring and analysis were performed in compliance with CFR 29 Part 1926.1101; and the data were obtained during work operations conducted under workplace conditions "closely resembling" the processes, type of material, control methods, work practices, and environmental conditions used and prevailing in the Contractor's current operations, the operations were conducted by employees whose training and experience were no more extensive than that of employees performing the current job, and these data show that under the conditions prevailing and which will prevail in the current workplace there is a high degree of certainty that employee exposures will not exceed the TWA and excursion limit; or

iii. The results of initial exposure monitoring of the current job made from breathing zone samples that are representative of the 8-hour TWA and 30-minute short-term exposures of each employee covering the operations that are most likely during the performance of the entire asbestos job to result in exposures over the PELs.

4. Field Tests

a. Air sampling reports.

b. Pressure differential recording local exhaust system.

c. Asbestos disposal waste disposal record report.

7. Air Sampling Results

a. Area Air Sampling (supplied by the Owner) and Personnel Air Sampling (provided by the Contractor)

b. Air sample fiber counting shall be completed and results provided within 24 hours after completion of a sampling period. The Owner shall be notified immediately of any airborne levels of asbestos fibers in excess of established requirements. Written sampling results shall be provided within 5 working days of the date of collection. The air sampling results shall be documented on a daily air-monitoring log.

8. Pressure Differential Recordings

a. Pressure differential recordings shall be provided daily on the same day collected. The Contractor's competent person shall review the readings prior to being submitted. The Owner shall be notified immediately of any variance in the pressure differential which could cause adjacent unsealed areas to have asbestos fiber concentrations in excess of 0.005 fiber per cubic centimeter (f/cc) or background, whichever is higher.

9. Records

a. Respirator Program

i. Records of the respirator program as required by ANSI Z88.2, CFR 29 Part 1910, Section 1910.134, CFR 29 Part 1926, Section 1926.58.

b. Asbestos Waste Shipment

i. Final completed copies of the Waste Shipment Record for all shipments of waste material as specified in CFR 40 Part 61, Subpart M and other required state waste manifest shipment records as specified herein. Detailed information of all asbestos waste disposals on the "MANDATORY WASTE SHIPMENT RECORD" form in accordance with revised CFR 40 Part 61, Subpart M. Such completed forms signed and dated by the agent of the landfill shall be submitted within 3 days after date of delivery of ACM to the landfill.

1.17 PERSONAL PROTECTIVE EQUIPMENT

A. Respirators

Respiratory protection shall be worn by all individuals inside the work area from the initiation of the asbestos project until all areas have successfully passed clearance air monitoring:

1. Respirator Selection:

a. Where respirators are used, the Contractor shall select and provide, at no cost to the employee, the appropriate respirator, and shall ensure that the employee uses the respirator provided.

b. The Contractor shall select respirators from among those jointly approved as being acceptable for protection by the Mine Safety and Health Administration (MSHA) and the National Institute for Occupational Safety and Health (NIOSH) under the provisions of 30 CFR 11.

c. The Contractor shall provide a tight fitting powered, air-purifying respirator in lieu of any negative-pressure respirator specified whenever:

1. An employee chooses to use this type of respirator, and

2. This respirator will provide adequate protection to the employee.

B. Respirator Program:

1. Where respiratory protection is used, the Contractor shall institute a respirator program in accordance with CFR 29 Part 1910.134. The Contractor shall permit each employee who uses a filter respirator to change the filter elements whenever an increase in breathing resistance is detected and shall maintain an adequate supply of filter elements for this purpose.

2. Employees who wear respirators shall be permitted to leave work areas to wash their faces and respirator face pieces whenever necessary to prevent skin irritation associated with respirator use.

C. Respirator Fit Testing:

1. The Contractor shall ensure that the respirator issued to the employee exhibits the least possible face piece leakage and that the respirator is fitted properly. The Contractor shall perform either quantitative or qualitative face fit tests at the time of initial fitting and at least every 6 months thereafter for each employee wearing a negative-pressure respirator. The qualitative fit tests may be used only for testing the fit of half-mask respirators where they are permitted to be worn or of full-face piece air purifying respirators where they are worn at levels at which half-face piece air purifying respirators are permitted. A qualitative or quantitative fit test conforming to CFR 29 Part 1926, Appendix C shall be conducted by the Contractor for each Contractor worker required to wear a respirator, and for the Owner and authorized visitors who enter an asbestos regulated work area where respirators are required to be worn.

D. Whole Body Protection

1. Personnel exposed to asbestos shall be provided with whole body protection, as specified herein and such protection shall be worn properly. The Contractor and competent person supervisor shall select and approve the whole body protection to be used. The competent person shall examine work suits worn by employees at least once per work shift for rips or tears that may occur during performance of work. When rips or tears are detected while an employee is working, rips and tears shall be immediately mended, or the work suit shall be immediately replaced. Disposable whole body protection shall be disposed of as asbestos contaminated waste

upon exiting from the asbestos regulated work area. Reusable whole body protection worn shall be either disposed of as asbestos contaminated waste upon exiting from the asbestos regulated work area or be properly laundered in accordance with CFR 29 Part 1926 and as specified in the Contractor's Asbestos Hazard Abatement Plan. A worker shall not remove asbestos abatement whole body protection from the work site to be cleaned.

2. Disposable-impermeable coveralls with a zipper front shall be provided. Sleeves shall be secured at the wrists, and foot coverings secured at the ankles.

3. Gloves shall be provided to protect hands. Cloth gloves may be worn inside the plastic or rubber gloves for comfort, but shall not be used alone. Where there is the potential for hand injuries (i.e., scrapes, punctures, cuts, etc.) an appropriate glove shall be provided and used.

4. An additional coverall similar to that required in paragraph Coveralls shall be provided when the abatement and control method employed does not provide for the exit from the asbestos regulated work area directly into an attached decontamination unit. Cloth work clothes shall be provided for wear under the protective coverall and foot coverings when work is being conducted in low temperature conditions. Cloth work clothes shall be either disposed of as asbestos contaminated material or properly laundered in accordance with CFR 29 Part 1926 and as specified in the Contractor's Asbestos Hazard Abatement Plan.

5. Cloth socks shall be provided and worn next to the skin. If rubber boots are not used, footwear and disposable foot coverings shall be provided. Rubber boots shall be used in moist or wet areas. Only rubber boots shall be removed from the asbestos regulated work area after being thoroughly decontaminated. All other protective foot covering shall be disposed of as ACM.

6. Hood type disposable head covering shall be provided. In addition, protective headgear (hard hats) shall be provided as required. Hard hats shall only be removed from the asbestos regulated work area after being thoroughly decontaminated.

7. Contact lenses shall not be worn in asbestos regulated work areas. When vision correction is necessary to perform the work task, prescription safety eyewear shall be used. Personnel engaged in asbestos abatement activities in the asbestos regulated work area shall wear fog-proof goggles when the use of a full face-piece respirator is not required. Eye protection provided shall be in accordance with ANSI Z87.1.

8. All other items of whole body protection shall be provided as required and approved by the Contractor.

1.18 DECONTAMINATION UNIT AND LOAD OUT UNIT

A. Contractor shall take into account emergency egress issues related to the entire building when completing his abatement work plan. Decontamination and load out units will be sized, constructed and located so as to not impede ingress and egress to and from other portions of the building where abatement is not occurring.

B. Decontamination and load out units shall be the sized, constructed and located so as to not impede the access to ACM to be abated. If access to ACM above the decontamination and load out units require

abatement personnel to utilize them to gain access (i.e. get on top of the units) to the ACM, they shall be constructed meeting all OSHA safety guidelines.

C. Provide each work area with separate personnel decontamination unit and equipment load out unit. Ensure that the decontamination unit is the only means of ingress and egress for the work area and that all equipment, bagged waste material and other material exit the work area only through the decontamination unit and equipment load out unit.

D. All persons entering and exiting the work area will follow the entry and exit procedures required by the applicable regulations and these specifications. Process all equipment and material exiting the work area through the decontamination unit and equipment load out unit and decontaminate as required by the specifications.

E. Construct walls and ceilings of decontamination unit and equipment load out unit airtight with at least 6 mil polyethylene sheeting and attach to existing building components or to a temporary framework. The decontamination unit and equipment load out unit may be combined if the size of the work area will not permit both.

F. Use a minimum of two layers of 6-mil opaque polyethylene to cover floor under decontamination unit. Construct doors from overlapping polyethylene sheets so that they overlap adjacent surfaces. Weight sheets at bottom so that they quickly close after release. Put arrows on sheets showing direction of overlap and travel.

G. Provide temporary water service connection to the decontamination unit and equipment load out unit. Provide backflow protection at the point of connection to the Owner's system.

H. Water supply must be properly pressured and temperature balanced at shower discharge.

I. Provide adequate temporary electric power with ground fault protection and overhead wiring throughout the decontamination unit and equipment load out unit. Provide a sub-panel for all temporary power in changing room.

J. Provide a decontamination unit consisting of serial arrangement of clean room, showers room and equipment room. Provide adequately sized decontamination unit to accommodate the number of employees scheduled for the project. The center chamber of the three chamber decontamination unit will be fitted with as many portable walk through shower stalls as necessary so that all employees will be able to go through the entire decontamination procedure within 15 minutes. Construct decontamination unit of opaque or colored polyethylene for privacy. Construct decontamination unit so that it will not allow for parallel routes of exit without showering

1.19 WARNING SIGNS AND TAPE

A. Contractor shall ensure that all personnel understand the warning signs. Warning signs and tape printed in English and Spanish shall be provided at the regulated boundaries and entrances to asbestos regulated work areas. Signs shall be located at such a distance that personnel may read the sign and take the necessary protective steps required before entering the area. Warning signs shall be in vertical format conforming to CFR 29 Part 1910, and CFR 29 Part 1926, minimum 500 by 360 mm 20 by 14 inches and displaying the following legend in the lower panel:

B. Legend Lettering

1. Danger 3-inch Sans Serif Gothic or Block
2. Asbestos 1-inch Sans Serif Gothic or Block
3. Cancer and Lung Disease Hazard 1-inch Sans Serif Gothic or Block
4. Authorized Personnel Only 1-inch Sans Serif Gothic or Block
5. Authorized Personnel Only 1-inch Gothic
6. Respirators and Protective Clothing are required in this Area 1-inch Gothic
7. Spacing between lines shall be at least equal to the height of the upper of any two lines. Warning tape shall be provided

1.20 WARNING LABELS

A. Warning labels shall be affixed to all asbestos disposal containers used to contain asbestos materials, scrap, waste debris, and other products contaminated with asbestos. Containers with preprinted warning labels conforming to requirements specified herein are acceptable. Warning labels shall conform to CFR 29 Part 1926 and shall be of sufficient size to be clearly legible displaying the following legend:

DANGER

CONTAINS ASBESTOS FIBERS

AVOID CREATING DUST

CANCER AND LUNG DISEASE

HAZARD

1.21 LOCAL EXHAUST SYSTEM

A. A local exhaust system shall be provided in the asbestos regulated work area in accordance with ANSI Z9.2 and CFR 29 Part 1926. The system will provide at least 4 air changes per hour inside of the containment. The local exhaust system shall be operated 24 hours per day, until the asbestos regulated containment area is removed and shall be leak proof to the filter and equipped with HEPA filters. Local exhaust equipment shall be sufficient to maintain a minimum pressure differential of minus 0.51 mm (0.02 inch) 0.02 inch of water column relative to adjacent, unsealed areas. Pressure differential shall be monitored continuously, 24 hours per day, with an automatic recording instrument. In no case shall the building ventilation system be used as the local exhaust system for the asbestos regulated work area. Filters on local exhaust system equipment shall conform to ANSI Z9.2 and UL 586. Filter shall be UL labeled. The local exhaust system shall terminate out of doors. All filters used shall be new at the beginning of the project and shall be periodically changed as necessary and disposed of as ACM waste.

B. Prior to the start of the abatement the Contractor shall inspect all negative air machines and insure that all gaskets are in place, that all HEPA filters in the units are properly seated and mechanical brackets that secure the HEPA filters are intact. This inspection will be conducted in conjunction with the Owners Representative prior to the start of abatement activities. All deficiencies associated with the negative air machines shall be repaired prior to the start of the abatement. All defective units shall be removed and replaced.

1.22 TOOLS

A. Vacuums shall be leak proof to the filter, equipped with HEPA filters, be of sufficient capacity and provide the necessary capture velocity at the nozzle or nozzle attachment to efficiently collect, transport and retain the ACM waste material. Power tools shall not be used to remove ACM unless the tool is equipped with effective, integral HEPA filtered exhaust ventilation capture and collection system or has otherwise been approved for use by the Owner. All residual asbestos shall be removed from reusable tools prior to storage and reuse. Reusable tools shall be thoroughly decontaminated prior to being removed from asbestos regulated work areas.

1.23 RENTAL EQUIPMENT

A. If rental equipment is to be used, written notification shall be provided to the rental agency, concerning the intended use of the equipment, the possibility of asbestos contamination of the equipment and the steps that will be taken to decontaminate such equipment. A written acceptance of the terms of the Contractor's notification shall be obtained from the rental agency.

1.24 PERSONNEL AIR MONITORING EQUIPMENT (CONTRACTOR PROVIDED)

A. The Contractor is responsible for all personnel sampling as outlined in Section 3.12 herein, and shall select and approve the air monitoring equipment to be provided and used by the Contractor for evaluation of personnel exposure levels to airborne asbestos fiber concentrations within the work area. The equipment shall include, but not be limited to:

1. Low-volume, battery powered, body-attachable, portable personal pumps that can be calibrated to a constant airflow up to approximately 3.5 liters per minute when equipped with a sampling train of tubing and filter cassette, and a self-contained rechargeable power pack capable of sustaining the calibrated flow rate for a minimum of 10 hours. The pumps shall also be equipped with an automatic flow control unit, which shall maintain a constant flow even as filter resistance increases due to accumulation of fiber and debris on the filter surface,

2. Standard 25 millimeter diameter, 0.8 micrometer micron pore size, mixed cellulose ester membrane filters and cassettes with nonconductive barrels and shrink bands, to be used with low flow pumps in accordance with CFR 29 Part 1926, for personal air sampling,

3. Standard 25 millimeter diameter, 0.45 micrometer micron pore size, mixed cellulose ester membrane filters and cassettes with non-conductive barrels and shrink bands, to be used with high flow pumps when conducting environmental area sampling using NIOSH Pub No. 84-100 Methods 7400 and 7402 and the transmission electric microscopy method specified at CFR 40 Part 763,

4. Appropriate plastic tubing to connect the air sampling pump to the selected filter cassette,

5. A flow calibrator capable of calibration to within plus or minus 2 percent of reading over a temperature range of minus 4 degrees Fahrenheit to plus 140 degrees Fahrenheit and traceable to a National Institute for Standards and Technology (NIST) primary standard.

1.25 EXPENDABLE SUPPLIES

A. Glove Bag

1. Glove bags shall be provided as described in CFR 29 Part 1926. The glove bag assembly shall be prefabricated with a preprinted OSHA warning label and shall typically be constructed of 6 mil thick transparent polyethylene or polyvinyl chloride sheeting and at least two inward projecting long sleeves and an internal pouch. The glove bag shall be constructed and installed in such a manner that it surrounds the object or material to be removed and contains all asbestos fibers released during the process. The glove bag shall have sufficient capacity to hold removed materials and permit leak-tight sealing.

B. Duct Tape

1. Industrial grade duct tape shall be provided in 2 inch and 3 inch widths and shall be suitable for bonding sheet plastic and disposal containers specified herein.

C. Disposal Containers

1. Leak-tight disposal containers shall be provided for ACM generated as specified herein. Leak-tight means neither solids, liquids or dust can escape or spill out. All disposal containers shall be either pre-labeled or affixed with OSHA warning label as specified in CFR 29 Part 1926.

D. Disposal Bags

1. 6-mil thick leak-tight pre-labeled (OSHA warning label) bags shall be provided for placement of asbestos generated waste.

E. Leak-tight Wrapping

1. Two layers of 6-mil (minimum) thick polyethylene sheeting stock shall be used for the containment of removed asbestos-containing components or materials such as reactor vessels, large tanks, boilers, insulated pipe segments and other materials too large to be placed in disposal bags. Upon placement of the ACM component or material, each layer shall be individually leak-tight sealed with duct tape.

F. Fiberboard Drums

1. Fiberboard drums shall be provided if required by state or local requirements.

G. Cardboard Boxes

1. Heavy-duty corrugated cardboard boxes coated with plastic or wax to retard deterioration from moisture shall be provided if required by state and local requirements. Boxes shall fit into selected ACM disposal bags. Filled boxes shall be sealed leak-tight with duct tape.

H. Sheet Plastic

1. Sheet plastic shall be provided as specified herein and in the largest sheet size necessary to minimize seams, as indicated on the project drawings.

I. Polyethylene Sheet – General

1. 6-mil (minimum) thick polyethylene sheeting shall be clear, frosted and/or black and conform to ASTM D 4397.

J. Polyethylene Sheet – Flame Resistant

1. Where a potential for fire exists, 6-mil (minimum) thick flame-resistant polyethylene sheet shall be provided. Flame-resistant polyethylene film shall be frosted and/or black and shall conform to the requirements of NFPA 701.

K. Polyethylene Sheet-Reinforced

1. 6-mil thick reinforced polyethylene sheet shall be provided where high skin strength is required such as where it constitutes the only barrier between the asbestos regulated work area and the outdoor environment. The sheet stock shall consist of translucent, nylon-reinforced or woven-polyethylene thread laminated between two layers of polyethylene film. Film shall meet flame resistant standards of NFPA 701.

L. Viewing Inspection Window

1. Where feasible, a minimum of one clear 1/8-inch thick acrylic sheet, 18 inches by 24 inches, shall be installed as a viewing inspection window at eye level on a wall in each containment enclosure. All such windows shall be sealed leak-tight with industrial grade duct tape.

M. Wetting Agents

1. Amended water shall meet the requirements of ASTM D 1331.

N. Removal Encapsulant

1. Removal encapsulant (a penetrating encapsulant) shall be provided when conducting removal abatement activities that require a longer removal time or are subject to rapid evaporation of amended water. The removal encapsulant shall be capable of wetting the ACM and retarding fiber release during disturbance of the ACM equal to or greater than provided by amended water

O. Strippable Coating

1. Strippable coating found in aerosol cans, will be used to adhere to surfaces and to be removed cleanly by stripping at the completion of work. Since these coatings have a hydrocarbon-carrying agent, its use shall be confined to well ventilated areas only.

P. Non-combustible Foam

1. All foam shall be Hilti CF 810 CJ Insulating Foam or an approved equivalent.

1.26 MATERIAL SAFETY DATA SHEETS

A. Material safety data sheets (MSDS) shall be provided for all hazardous materials brought onto the work-site. One copy shall be provided to the Owner's Representative on-site and one copy shall be included in the Contractor's Hazard Communication Program.

1.27 OTHER ITEMS

A. A sufficient quantity of other items shall be provided that may include, but not be limited to: scrapers, brushes, brooms, staple guns, tarpaulins, shovels, rubber squeegees, dust pans, other tools, scaffolding, staging, enclosed chutes, wooden ladders, lumber necessary for the construction of asbestos regulated containment work areas, UL approved temporary electrical equipment, material and chords, ground fault circuit interrupters, water hoses of sufficient length, fire extinguishers, first aid kits, portable toilets, logbooks, log forms, markers with indelible ink, spray paint in bright color to mark areas, project boundary fencing, etc.

1.28 PRECONSTRUCTION CONFERENCE

A. The Contractor, and the Contractor's designated onsite "competent person," shall meet with the Owners Representative and Owner prior to beginning work at a preconstruction conference to discuss the details of the Contractor's Asbestos Hazard Abatement Plan, including work procedures and safety precautions. Once accepted by the Owners Representative and Owner, the Asbestos Hazard Abatement Plan, will be enforced as if an addition to the specification.

PART 2 - PRODUCTS

2.1 ENCAPSULANTS

A. Encapsulant shall conform to USEPA requirements, shall contain no toxic or hazardous substances.

PART 3 - EXECUTION

3.1 GENERAL

A. Asbestos abatement work shown on plans and drawings shall be performed as specified herein. Personnel shall wear and utilize protective clothing and equipment as specified herein. Eating, smoking, drinking, or applying cosmetics shall not be permitted in the asbestos regulated work area. All hot work (burning, cutting, welding, etc.) shall be conducted under strictly controlled conditions in conformance with CFR 29 Part 1926. Personnel of other trades not engaged in asbestos abatement activities shall not be exposed at any time to airborne concentrations of asbestos unless all the administrative and personal protective provisions as required by the Contractors Asbestos Abatement Plan are complied with. The building heating, ventilating, and air conditioning system shall be shut down, all openings to the system capped leading into the abatement work area.

B. Electrical service shall be disconnected where necessary to facilitate wet removal. Temporary electrical service shall be provided by the Contractor as needed. Temporary power provided by the Contractor shall be adequate to power for the Owners' Representatives' air monitoring equipment.

C. If an asbestos spill occurs outside of the asbestos regulated work area, work shall be stopped and the Owners' Representative and Owner shall be notified. The condition shall be corrected to the satisfaction of the Owners' Representative and Owner including air sampling, prior to resumption of work.

3.2 PROTECTION OF ADJACENT WORK OR AREAS TO REMAIN

A. Asbestos abatement work shall be performed without damage or contamination of adjacent work or areas. Where such work or area is damaged or contaminated as verified by the Owners Representative using visual inspection and/or sample analysis, it shall be restored to its original condition or decontaminated by the Contractor at no expense to the Owner as deemed appropriate by the Owners Representative. This includes inadvertent spill of dirt, dust or debris in which it is reasonable to conclude that asbestos may exist. When these spills occur, work shall stop in all affected areas immediately and the spill shall be cleaned. When satisfactory visual inspection and/or sampling analysis results are obtained and have been evaluated by the Contractor and the Owners Representative, work may proceed.

3.3 FURNISHINGS, FIXTURES AND EQUIPMENT

A. Removal of Furnishings and Equipment

1. The Owner will remove all sensitive equipment and furniture from the work areas before asbestos abatement work begins.

B. Items to Remain

1. Contractor shall protect all existing data, smoke/fire alarm systems, access control systems, closed circuit television systems, telephone, electrical and fire suppression lines located in areas affected by abatement operations. Costs for repairs associated with damage incurred during abatement, demolition and put-back operations will be at the GC's expense.

3.4 BUILDING VENTILATION SYSTEM AND CRITICAL BARRIERS

A. Any building ventilating system supplying air into or returning air out of an asbestos regulated work area shall be shut down and isolated by lockable switch or other positive means in accordance with CFR 29 Part 1910, Section 1910.147, to prevent accidental start-up and isolated by airtight seals to prevent contaminant spread through the system. Air-tight critical barriers shall be installed on all building ventilating openings that supply, or return air from the building ventilation system or serves to exhaust air from the building, that are located inside the asbestos regulated work area. The critical barriers shall consist of air-tight rigid covers for building ventilation supply and exhaust grills where the ventilation system is required to remain in service during abatement. Edges to wall, ceiling and floor surfaces shall be sealed with industrial grade duct tape.

3.5 PRECLEANING

A. Surfaces shall be cleaned by HEPA vacuum and adequately wet wiped prior to establishment of containment.

3.6 ASBESTOS CONTROL AREA REQUIREMENTS

A. Regulated containment areas shall be established and maintained for each abatement work task. Viewing inspection window shall be installed on the wall of the containment enclosure, as specified herein. The following procedures shall be performed sequentially and each activity shall be completed before proceeding to the next. Various steps may be omitted for an individual containment area when that work is not specified on the drawings.

1. Furnishings in the asbestos regulated work area shall be cleaned, protected in place removed as specified herein.

2. Tools, scaffolding, staging, and incidentals necessary for the work shall be placed in the area to be isolated prior to erection of work area enclosed containment.

3. Building ventilating systems serving the work area shall be shutdown or isolated.

4. Power to the asbestos regulated work area shall be locked-out by switching off all breakers serving power or lighting to this area in accordance with CFR 29 Part 1910.

5. Surfaces shall be pre-cleaned as required herein.

6. Personnel Decontamination Unit shall be installed as specified. Load-Out unit shall be installed as specified herein.

7. Critical barriers shall be installed as required for building ventilation system and in the plenum space as required herein.

8. Local exhaust ventilation system shall be installed as specified.

9. Containment area shall be installed as required for each abatement task as specified.

3.7 CLEAN-UP

A. The Contractor shall maintain a clean work area by performing on a daily basis the following housekeeping functions at the end of each shift:

1. Loose ACM shall be prepared for disposal by packaging the waste and removing it from the work area to the load-out area.

2. Work area shall be HEPA vacuumed.

3. Polyethylene in work and high traffic areas shall be inspected and repaired.

4. Containment area shall be wet wiped if air sample results exceed prescribed level.

3.8 ASBESTOS HANDLING PROCEDURES

A. The Contractor shall employ proper handling procedures in accordance with CFR 29 Part 1926 and CFR 40 Part 61, Subpart M and the specification requirements herein. The specific abatement techniques and items identified shall be detailed in the Contractor's Asbestos Hazard Abatement Plan including but not limited to details of construction materials, equipment, and handling procedures. The following task descriptions detail the required abatement handling technique.

1. Removal of ACM From Interior Architectural System

    a. After completion of all asbestos removal work, surfaces from which asbestos containing materials have been removed shall be wet wiped or sponged clean, or cleaned by some equivalent method to remove all visible residue. After the gross amounts of asbestos have been removed from every surface, all remaining visible accumulations of asbestos on floors shall be collected using plastic shovels, rubber squeegees, rubber dustpans and HEPA vacuum cleaners as appropriate to maintain the integrity of the containment barrier. When all insulation has been removed, workmen shall use HEPA vacuum cleaners to vacuum every surface. Particular attention shall be paid to those surfaces or locations that could harbor accumulations or residual asbestos dust.

2. Sealing Contaminated Items Designated for Disposal

    a. Contaminated architectural, mechanical, and electrical appurtenances and other contaminated items designated for removal shall be coated with an asbestos lockdown encapsulant at the demolition site before being removed from the asbestos control area. These items need to be vacuumed prior to application of the lock-down encapsulant.

    b. The asbestos lockdown encapsulant shall be tinted a contrasting color. It shall be spray-applied by airless method. Thoroughness of sealing operation shall be visually gauged by the extent of colored coating on exposed surfaces.

3.9 FINAL CLEANING AND PRE-VISUAL INSPECTION

A. The asbestos regulated work area shall be cleaned at the completion of the abatement by collecting, packing, and storing all gross contamination. A final cleaning shall include HEPA vacuum and wet cleaning of all exposed surfaces and equipment in the asbestos regulated work area. Upon completion of the cleaning, the Contractor's competent person shall conduct a pre-visual inspection of the cleaned area in preparation for the final inspection to be conducted with the Owners Representative. The Contractor shall re-clean, as necessary. Upon completion of the final cleaning, the Contractor and the Owners Representative shall conduct a final visual inspection of the cleaned work area in accordance with ASTM E 1368 and document the results on the Final Cleaning and Visual Inspection. If the Owners Representative rejects the abatement area as not meeting final cleaning requirements, the Contractor shall re-clean as necessary and have a follow-up inspection with the Owners Representative. Re-cleaning and follow-up re-inspections by the Owners Representative shall be at the Contractor's expense.

3.10 LOCKDOWN

A. Prior to removal of plastic barriers and after clean up of gross contamination and final visual inspection, a post removal (lockdown) encapsulant shall then be spray applied to foundation walls, underside of floors, and all vertical and horizontal surfaces within the work area. The abatement area shall include but not be limited to constructed enclosures, barriers, polyethylene sheeting that covers any furnishings, and equipment articles to be discarded, critical barriers, air locks, load out units for bag removal, and onsite constructed decontamination unit.

3.11 AIR MONITORING

Air Monitoring by the Contractor:

A. The Contractor shall provide daily 8-hour TWA PEL and daily 30-minute Excursion Limit personal breathing zone air monitoring in accordance with and in addition to 29 CFR 1926.1101(f), including all amendments, and Appendix A of the OSHA standard within the work sites throughout all asbestos work site enclosure, material stripping, removal, cleaning encapsulation operations, or any other activities which might disturb asbestos-containing materials to insure that the workers are adequately protected at all times.

B. Samples shall be collected by calibrated pumps whose flow rates can be determined to an accuracy of plus or minus 5 percent. Calibrate pumps both prior to and after each use with a representative filter in line.

C. Analysis of samples shall be done in accordance with 29 CFR 1926.1101(f) and Appendix A of the OSHA standard. The results of all samples shall be posted outside the containment area within 48 hours of sampling and maintained there until the project has been concluded. This data shall include both the results of individual samples and the results of 8 hour TWA and 30-minute Excursion Limit determinations. Posted results shall include a synopsis of work activities for which the results are representative. Records shall be made of each employee's personal monitoring results and the employee shall be notified of these results within 15 days either individually or by posting them in a central location in accordance with 29 CFR 1926.1101(f).

D. All analytical results from the Contractor's air monitoring shall be posted at the work site entrance as soon as they become available and not more than 48 hours from the time in which the samples were taken.

Air Monitoring by the Owner:

A. The Owner shall provide the services of an independent testing laboratory with qualified analysts and appropriate equipment to conduct sample analyses of area air samples using the methods prescribed in CFR 29 Part 1926 Section 1926.58 to include NIOSH Pub No. 84-100 Method 7400. Sampling performed in accordance with CFR 29 Part 1926 Section 1926.58 shall be performed by the Owners Representative. The Owners Representative shall perform final clearance air sampling utilizing Phase Contract Microscopy (PCM) analysis. For environmental quality control and final air clearance NIOSH Pub No. 84-100 Method 7400 (PCM) with optional confirmation of results by NIOSH Pub No. 84-100 Method 7402 Transmission Electron Microscopy (TEM) the mandatory EPA TEM Method specified at CFR 40 Part 763 shall be used. For environmental and final clearance samples, sampling will be conducted at a sufficient velocity and time to collect a sample volume necessary to establish the limit of detection of the method used at 0.01 f/cc. Asbestos fiber concentration confirmation of the total fiber concentration results of environmental, quality assurance and final air clearance samples, collected and analyzed by NIOSH Pub No. 84-100 Method 7400, may be conducted.

1. Sampling Prior to Asbestos Work

    a. The baseline air sampling shall be established one day prior to the masking and sealing operations for each abatement area site. The background shall be established by performing area sampling in similar but uncontaminated sites in the building. Pre-

abatement (NIOSH Pub No. 84-100 Method 7400, PCM, and EPA TEM Method specified at CFR 40 Part 763) air samples shall be collected at a minimum of three locations. These locations are: outside the building, inside the building, but outside the abatement area perimeter and inside each abatement area. One sample shall be collected for every 185 square meters 2,000 square feet of floor space. At least two sample locations shall be collected outside the building. The PCM samples shall be analyzed immediately; and if any result in fiber concentration greater than 0.01 f/cc, asbestos fiber concentration shall be confirmed using NIOSH Pub No. 84-100 Method 7402 (TEM) at Owner expense.

2. Sampling During Asbestos Abatement Work

    a. The Owner shall provide area air sampling as indicated in CFR 29 Part 1926 Section 1926.58, and meet state and local requirements. Area air sampling shall be conducted at least once every shift, close to the work in the containment area, outside the clean room entrance to the containment area, (outside air lock for mini and modified containment areas), inside the clean room (inside the air lock for mini and modified containment areas), outside the load-out unit exit, if used, and at the exhaust discharge point of the local exhaust system.

3. Sampling After Final Clean-Up (Clearance Sampling)

    a. Prior to conducting final air clearance sampling, the Contractor and the Owners Representative shall conduct a final visual inspection of the Contractor's final cleanup of the abated asbestos regulated work area as specified. Final clearance air monitoring shall not begin until acceptance of this final cleaning by the Owners Representative. The Owners Representative will provide area sampling of airborne fibers using air sampling techniques as defined in the EPA 560/5-85-024 or as otherwise required by Federal or state requirements.

4. Air Clearance Failure

    a. Should clearance-sampling results fail to meet the final clean-up requirements, the Contractor shall pay all costs associated with all required re-cleaning, re-sampling and analysis until final clean-up requirements are met.

3.12 SITE INSPECTION

A. While performing asbestos removal work, the Contractor shall be subject to onsite inspection by the Owners Representative who may be assisted by or represented by quality assurance, safety and industrial hygiene personnel. If the work is found to be in violation of this specification, the Owner or his representative will issue a stop work order to be in effect immediately and until the violation is resolved. Standby time required to resolve the violation shall be at the Contractor's expense.

3.15 CLEAN-UP AND DISPOSAL

A. Housekeeping

1. Surfaces of the regulated work area shall be kept free of accumulation of asbestos-containing debris. Meticulous attention shall be given to restricting the spread of dust and debris during the abatement activities. HEPA filtered vacuum cleaners shall be used. The space shall not be blown down with compressed air.

B. Title to Materials

1. Material resulting from abatement work, except as specified otherwise, shall become the property of the Contractor and shall be disposed of as specified in applicable local, state, and Federal regulations and herein.

C. Collection and Disposal of Asbestos

1. Asbestos waste, asbestos contaminated water, scrap, debris, bags, containers, equipment, and asbestos contaminated clothing, shall be collected and placed in sealed leak-tight, containers (e.g. double 6-mil plastic bags), sealed 6-mil double wrapped polyethylene sheet, sealed fiberboard boxes or other approved containers. Waste within the containers must be wetted in case the container is breeched. A warning and Department of Transportation (DOT) label shall be affixed or preprinted on each bag. Waste asbestos material shall be disposed of at an EPA, state and local approved asbestos landfill. For temporary storage, sealed impermeable containers shall be stored in asbestos waste load-out unit or in a storage/transportation conveyance (i.e.; dumpster, roll-off waste boxes, etc.) in a manner as accepted by and in an area as assigned by the Owner. Procedure for hauling and disposal shall comply with CFR 40 Part 61, Subpart M, and state, regional, and local standards.

D. Asbestos Waste Shipment Record

1. The Contractor shall complete and provide final completed copies of the Waste Shipment Record for all shipments of waste material as specified in CFR 40 Part 61, Subpart M and other required state waste manifest shipment records within 3 days of delivery to the landfill.

APPENDIX

Asbestos Containing Materials Bulk Laboratory Analytical Reports

Coker Life Sciences Building

Performed by USC HAZMAT Personnel

Lab Reports Dated: September 10, 2012 (PLM)

September 13, 2012 (TEM)

Bulk Asbestos Analysis

By Polarized Light Microscopy
EPA Method: 600/R-93/116 and 600/M4-82-020

NVLAP Lab Code: 200664-0

Customer: University of South Carolina
743 Greene St
Columbia, SC 29208

Attn: Darryl Washington

Project: 100 Coker - 7th floor

Lab Order ID: 1214827
Analysis ID: 1214827PLM
Date Received: 9/10/2012
Date Reported: 9/10/2012

Sample ID / *Lab Sample ID*	Description / *Lab Notes*	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes / Treatment
1 - A	Black 12x12 floor tile	**None Detected**		**100% Other**	Black Non Fibrous Homogeneous
1214827PLM_1	*tile*				Dissolved
1 - B	Black 12x12 floor tile	**None Detected**		**100% Other**	Yellow Non Fibrous Homogeneous
1214827PLM_36	*mastic*				Dissolved
2 - A	Black 12x12 floor tile	**None Detected**		**100% Other**	Black Non Fibrous Homogeneous
1214827PLM_2	*tile*				Dissolved
2 - B	Black 12x12 floor tile	**None Detected**		**100% Other**	Yellow Non Fibrous Homogeneous
1214827PLM_37	*mastic*				Dissolved
3 - A	Black 12x12 floor tile	**None Detected**		**100% Other**	Black Non Fibrous Homogeneous
1214827PLM_3	*tile*				Dissolved
3 - B	Black 12x12 floor tile	**None Detected**		**100% Other**	Yellow Non Fibrous Homogeneous
1214827PLM_38	*mastic*				Dissolved
4	Yellow sheet flooring	**10% Chrysotile**	**5% Cellulose**	**85% Other**	Yellow Fibrous Heterogeneous
1214827PLM_4					Teased
5	Yellow sheet flooring	**Not Analyzed**			
1214827PLM_5					

Disclaimer: Due to the nature of the EPA 600 method, asbestos may not be detected in samples containing low levels of asbestos. We strongly recommended that analysis of floor tiles, vermiculite, and/or heterogeneous soil samples be conducted by TEM for confirmation of "None Detected" by PLM. This report relates only to the samples tested and may not be reproduced, except in full, without the written approval of SAI. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. government. Estimated MDL is 0.1%.

Bobby Wheatley (38)

Analyst

Nathaniel Durham, MS or Approved Signatory

Bulk Asbestos Analysis

By Polarized Light Microscopy
EPA Method: 600/R-93/116 and 600/M4-82-020

NVLAP Lab Code: 200664-0

Customer: University of South Carolina
743 Greene St
Columbia, SC 29208

Attn: Darryl Washington

Project: 100 Coker - 7th floor

Lab Order ID: 1214827
Analysis ID: 1214827PLM
Date Received: 9/10/2012
Date Reported: 9/10/2012

Sample ID / *Lab Sample ID*	Description / *Lab Notes*	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes / Treatment
6	Yellow sheet flooring	**Not Analyzed**			
1214827PLM_6					
7	Black counter tops	**None Detected**		**100%** **Other**	Black Non Fibrous Homogeneous
1214827PLM_7					Crushed
8	Black counter tops	**None Detected**		**100%** **Other**	Black Non Fibrous Homogeneous
1214827PLM_8					Crushed
9	Black counter tops	**None Detected**		**100%** **Other**	Black Non Fibrous Homogeneous
1214827PLM_9					Crushed
10	2x2 ceiling tile	**None Detected**	**40%** **Cellulose** **40%** **Fiber Glass**	**20%** **Other**	Gray Fibrous Heterogeneous
1214827PLM_10					Teased
11	2x2 ceiling tile	**None Detected**	**40%** **Cellulose** **40%** **Fiber Glass**	**20%** **Other**	Gray Fibrous Heterogeneous
1214827PLM_11					Teased
12	2x2 ceiling tile	**None Detected**	**40%** **Cellulose** **40%** **Fiber Glass**	**20%** **Other**	Gray Fibrous Heterogeneous
1214827PLM_12					Teased
13	2x2 ceiling tile	**None Detected**	**40%** **Cellulose** **40%** **Fiber Glass**	**20%** **Other**	Gray Fibrous Heterogeneous
1214827PLM_13					Teased

Bobby Wheatley (38)

Analyst

Nathaniel Durham, MS or Approved Signatory

Bulk Asbestos Analysis

By Polarized Light Microscopy
EPA Method: 600/R-93/116 and 600/M4-82-020

NVLAP Lab Code: 200664-0

Customer: University of South Carolina
743 Greene St
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Attn: Darryl Washington

Project: 100 Coker - 7th floor

Lab Order ID: 1214827
Analysis ID: 1214827PLM
Date Received: 9/10/2012
Date Reported: 9/10/2012

Sample ID / *Lab Sample ID*	Description / *Lab Notes*	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes / Treatment
14	2x2 ceiling tile	None Detected	40% Cellulose 40% Fiber Glass	20% Other	Gray Fibrous Heterogeneous
1214827PLM_14					Teased
15	2x2 ceiling tile	None Detected	40% Cellulose 40% Fiber Glass	20% Other	Gray Fibrous Heterogeneous
1214827PLM_15					Teased
16	2x2 ceiling tile	None Detected	60% Cellulose 20% Fiber Glass	20% Other	Gray Fibrous Heterogeneous
1214827PLM_16					Teased
17	2x2 ceiling tile	None Detected	60% Cellulose 20% Fiber Glass	20% Other	Gray Fibrous Heterogeneous
1214827PLM_17					Teased
18	2x2 ceiling tile	None Detected	60% Cellulose 20% Fiber Glass	20% Other	Gray Fibrous Heterogeneous
1214827PLM_18					Teased
19	Fire proofing	None Detected	50% Fiber Glass	50% Other	Gray Fibrous Heterogeneous
1214827PLM_19					Teased
20	Fire proofing	None Detected	50% Fiber Glass	50% Other	Gray Fibrous Heterogeneous
1214827PLM_20					Teased
21	Fire proofing	None Detected	50% Fiber Glass	50% Other	Gray Fibrous Heterogeneous
1214827PLM_21					Teased

Bobby Wheatley (38)

Analyst

Nathaniel Durham, MS or Approved Signatory

Bulk Asbestos Analysis

By Polarized Light Microscopy
EPA Method: 600/R-93/116 and 600/M4-82-020

NVLAP Lab Code: 200664-0

Customer: University of South Carolina
743 Greene St
Columbia, SC 29208

Attn: Darryl Washington

Project: 100 Coker - 7th floor

Lab Order ID: 1214827
Analysis ID: 1214827PLM
Date Received: 9/10/2012
Date Reported: 9/10/2012

Sample ID / *Lab Sample ID*	Description / *Lab Notes*	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes / Treatment
22	Pre fab wall	None Detected	15% Cellulose	85% Other	Gray Non Fibrous Heterogeneous
1214827PLM_22					Crushed
23	Pre fab wall	None Detected	15% Cellulose	85% Other	Gray Non Fibrous Heterogeneous
1214827PLM_23					Crushed
24	Pre fab wall	None Detected	15% Cellulose	85% Other	Gray Non Fibrous Heterogeneous
1214827PLM_24					Crushed
25	Joint compound	None Detected		100% Other	White Non Fibrous Homogeneous
1214827PLM_25					Crushed, Teased
26	Joint compound	None Detected		100% Other	White Non Fibrous Homogeneous
1214827PLM_26					Crushed, Teased
27	Joint compound	None Detected		100% Other	White Non Fibrous Homogeneous
1214827PLM_27					Crushed, Teased
28	Joint compound	None Detected		100% Other	White Non Fibrous Homogeneous
1214827PLM_28					Crushed, Teased
29	Joint compound	None Detected		100% Other	White Non Fibrous Homogeneous
1214827PLM_29					Crushed, Teased

Bobby Wheatley (38)

Analyst

Nathaniel Durham, MS or Approved Signatory

Bulk Asbestos Analysis

By Polarized Light Microscopy
EPA Method: 600/R-93/116 and 600/M4-82-020

NVLAP Lab Code: 200664-0

Customer: University of South Carolina
743 Greene St
Columbia, SC 29208

Attn: Darryl Washington

Project: 100 Coker - 7th floor

Lab Order ID: 1214827
Analysis ID: 1214827PLM
Date Received: 9/10/2012
Date Reported: 9/10/2012

Sample ID / *Lab Sample ID*	Description / *Lab Notes*	Asbestos	Fibrous Components	Non-Fibrous Components	Attributes / Treatment
30	Sheetrock	None Detected	2% Cellulose	98% Other	White Non Fibrous Heterogeneous
1214827PLM_30					Crushed
31	Sheetrock	None Detected	2% Cellulose	98% Other	White Non Fibrous Heterogeneous
1214827PLM_31					Crushed
32	Sheetrock	None Detected	15% Cellulose	85% Other	White Non Fibrous Heterogeneous
1214827PLM_32					Crushed
33	Sheetrock	None Detected	3% Cellulose	97% Other	White Non Fibrous Heterogeneous
1214827PLM_33					Crushed
34	Sheetrock	None Detected	10% Cellulose	90% Other	White Non Fibrous Heterogeneous
1214827PLM_34					Crushed
35	Sheetrock	None Detected	10% Cellulose	90% Other	White Non Fibrous Heterogeneous
1214827PLM_35					Crushed

Bobby Wheatley (38)

Analyst

Nathaniel Durham, MS or Approved Signatory

Scientific Analytical Institute
4604 Dundas Dr. Greensboro, NC 27407
Phone: 336.292.3888 Fax: 336.292.3313
www.sailab.com lab@sailab.com

Lab Use Only
Lab Order ID: 121482-7
Client Code: _____

803-917-0291

Company Contact Information	D. Washington
Company: Un of S.C.	Contact: 803-917-0517
Address: 743 Green St.	Phone ☐: E. Pitts
Coker S.C, 29208	Fax ☐:
	Email ☐:

Billing/Invoice Information	Turn Around Times	
Company: Un of S.C.	90 Min. ☐	48 Hours ☐
Contact: D. Washington	3 Hours ☐	72 Hours ☐
Address:	6 Hours ☐	96 Hours ☐
	12 Hours ☐	120 Hours ☐
	24 Hours ☒	144+Hours ☐

Asbestos Test Types	
PLM EPA 600/R-93/116	☒
Positive stop	☒
PLM Point Count	☐
PCM NIOSH 7400	☐
TEM AHERA	☐
TEM Level II	☐
TEM NIOSH 7402	☐
TEM Bulk Qualitative	☐
TEM Bulk Chatfield	☐
TEM Bulk Quantitative	☐
TEM Wipe ASTM D6480-99	☐
TEM Microvac ASTM D5755-02	☐
TEM Water EPA 100.2	☐
Other: _____	☐

PO Number:
Project Name/Number: 100 - Coker - 7th Floor

Sample ID #	Description/Location	Volume/Area	Comments

Accepted ☒
Rejected ☐

Total # of Samples 35

Relinquished by	Date/Time	Received by	Date/Time
			9-10-04

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UNIVERSITY OF SOUTH CAROLINA

Building # #100 COKER - 7th Floor

Sample Analysis

Type of Analysis: Lead / Asbestos Date: 09-7-2012

Turn Around Time 24 HRS

Area	Sample ID	Material Sampled	Material Location	F/NF	Cond	Quantity	Pot to Disturb
A	1	BLACK 12 X 12 FLOOR TILE	COKER ROOM 709	NF	G	<200 SQ FT	LOW
A	2	BLACK 12 X 12 FLOOR TILE	COKER ROOM 709	NF	G	<200 SQ FT	LOW
A	3	BLACK 12 X 12 FLOOR TILE	COKER ROOM 709	NF	G	<200 SQ FT	LOW
B	4	YELLOW SHEET FLOORING	COKER ROOM 709	NF	G	3000 SQ FT	LOW
B	5	YELLOW SHEET FLOORING	COKER ROOM 709	NF	G	3000 SQ FT	LOW
B	6	YELLOW SHEET FLOORING	COKER ROOM 709	NF	G	3000 SQ FT	LOW
C	7	BLACK COUNTER TOPS	COKER ROOM 711	NF	G	<1000 SQ FT	LOW
C	8	BLACK COUNTER TOPS	COKER ROOM 709	NF	G	<1000 SQ FT	LOW
C	9	BLACK COUNTER TOPS	COKER ROOM 709	NF	G	<1000 SQ FT	LOW
D	10	2X2 CEILING TILE	COKER ROOM 709	F	G	<5000 SQ FT	LOW

License # 21534 FM# _____ Signature _____ Requestor _____

Send lab results in PDF format as soon as possible to:

Ed Pitts 803-777-3296
720 College St.
Columbia, SC 29208
EHP@fmc.sc.edu

Darryl Washington 803-777-2399
720 College St.
Columbia, SC 29208
WashinDH@fmc.sc.edu

Ty Russell 803-777-1208
720 College St.
Columbia, SC 29208
NTRusse@fmc.sc.edu

Fax # 803-777-3990

9/28/12

2 of 3
Coker

AREA	SAMPLE ID	MATERIAL SAMPLED	MATERIAL LOCATION	F/NF	COND	QUANTITY	POT TO DISTURB
D	11	2X2 CEILING TILE	COKER ROOM 709	F	G	<5000 SQ FT	LOW
D	12	2X2 CEILING TILE	COKER ROOM 709	F	G	<5000 SQ FT	LOW
D	13	2X2 CEILING TILE	COKER ROOM 709	F	G	<5000 SQ FT	LOW
D	14	2X2 CEILING TILE	COKER ROOM 709	F	G	<5000 SQ FT	LOW
D	15	2X2 CEILING TILE	COKER ROOM 709	F	G	<5000 SQ FT	LOW
E	16	2X2 CEILING TILE	COKER HALL WAY 7TH FLOOR	F	G	<5000 SQ FT	LOW
E	17	2X2 CEILING TILE	COKER HALL WAY 7TH FLOOR	F	G	<5000 SQ FT	LOW
E	18	2X2 CEILING TILE	COKER HALL WAY 7TH FLOOR	F	G	<5000 SQ FT	LOW
F	19	FIRE PROOFING	COKER ROOM 709	F	G	NA	LOW
F	20	FIRE PROOFING	COKER 7TH FLOOR HALL	F	G	NA	LOW
F	21	FIRE PROOFING	COKER 7TH FLOOR HALL	F	G	NA	LOW
G	22	PRE FAB WALL	COKER ROOM 714	F	G	<1000 SQ FT	LOW
G	23	PRE FAB WALL	COKER ROOM 709	F	G	<1000 SQ FT	LOW
G	24	PRE FAB WALL	COKER ROOM 712	F	G	<1000 SQ FT	LOW
H	25	JOINT COMPOUND	COKER ROOM 711	F	G	<5000 SQ FT	LOW
H	26	JOINT COMPOUND	COKER ROOM 709	F	G	<5000 SQ FT	LOW
H	27	JOINT COMPOUND	COKER ROOM 711	F	G	<5000 SQ FT	LOW

L29077

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UNIVERSITY OF SOUTH CAROLINA

Sample Analysis

Building # 100 COKER

Type of Analysis: Lead / Asbestos Date: 09-1-2012

Turn Around Time 24 HRS

Area	Sample ID	Material Sampled	Material Location	F/NF	Cond	Quantity	Pot to Disturb
H	28	JOINT COMPOUND	COKER ROOM 709	F	G	<5000 SQ FT	LOW
H	29	JOINT COMPOUND	COKER ROOM 709	F	G	<5000 SQ FT	LOW
I	30	SHEETROCK	COKER ROOM 711	F	G	<5000 SQ FT	LOW
I	31	SHEETROCK	COKER ROOM 709	F	G	<5000 SQ FT	LOW
I	32	SHEETROCK	COKER ROOM 714	F	G	<5000 SQ FT	LOW
I	33	SHEETROCK	COKER ROOM 711	F	G	<5000 SQ FT	LOW
I	34	SHEETROCK	COKER ROOM 709	F	G	<5000 SQ FT	LOW
I	35	SHEETROCK	COKER ROOM 709	F	G	<5000 SQ FT	LOW
			TEM # 3 & # 6 in negative				

License # 21534 FM# _____ Signature _____ Requestor _____

Send lab results in PDF format as soon as possible to:

Ed Pitts 803-777-3296
720 College St.
Columbia, SC 29208
EHP@fmc.sc.edu

Darryl Washington 803-777-2399
720 College St.
Columbia, SC 29208
WashinDH@fmc.sc.edu

Ty Russell 803-777-1208
720 College St.
Columbia, SC 29208
NTRusse@fmc.sc.edu

Fax # 803-777-3990

21482

Bulk Asbestos Analysis
by Transmission Electron Microscopy

Semi-Quantitative
Chatfield SOP 1988-02 Rev. 1

Client: University of South Carolina
743 Greene St
Columbia, SC 29208

Attn: Darryl Washington
Ed Pitts

Lab Order ID: 1214994
Analysis ID: 1214994_TBS
Date Received: 9/12/2012
Date Reported: 9/13/2012

Project: #100 Coker - 7th FLoor

Sample ID *Lab Sample ID*	Description *Lab Notes*	Organic *(Wt. %)*	Acid Sol. *(Wt. %)*	Asbestos *(Wt. %)*	*LCL-UCL* *(Wt. %)*
#3-A *1214994TBS_1*	Black 12x12 floor tile *tile*	15%	84%	None Detected	
#3-B *1214994TBS_2*	Black 12x12 floor tile *mastic*	18%	-%	None Detected	

Matt Thomas (2)

Analyst

Approved Signatory

Scientific Analytical Institute

1214994

From: PITTS, EDWARD [EHP@fmc.sc.edu]
Sent: Wednesday, September 12, 2012 10:20 AM
To: Scientific Analytical Institute
Subject: RE: 1214827_PLM Results (100 Coker - 7th floor)

Follow Up Flag: Follow up
Flag Status: Completed

Categories: Laura

Please do TEM on sample #3. 24 hr turn around . This Lab Order . Thanks, Ed Pitts

---

From: Scientific Analytical Institute [mailto:lab@sailab.com]
Sent: Tuesday, September 11, 2012 10:19 AM
To: WASHINGTON II, DARRYL
Cc: PITTS, EDWARD; RUSSELL III, TY; WASHINGTON II, DARRYL; Web Portal; WAGSTAFF, STEVEN
Subject: SAI: 1214827_PLM Results (100 Coker - 7th floor)

Darryl,

Attached is your analytical report for SAI Lab Order ID 1214827_PLM (100 Coker - 7th floor). If you have any questions, please feel free to give us a call.

Thank you,

Choose Quality.

Mamie Pope
Sample Coordination

lab@sailab.com
www.sailab.com

Scientific Analytical Institute, Inc.
4604 Dundas Drive
Greensboro NC 27407

tel: 877.292.3888
fax: 336.292.3313

1214994

Scientific Analytical Institute
4604 Dundas Dr. Greensboro, NC 27407
Phone: 336.292.3888 Fax: 336.292.3313
www.sailab.com lab@sailab.com

Lab Use Only
Lab Order ID: 1214827
Client Code: _____

803-917-0291

Company Contact Information	D. Washington
Company: Un of S.C.	Contact: 803-917-0517
Address: 743 Greene St.	Phone ☐: E. P. 1775
Cola S.C. 29208	Fax ☐:
	Email ☐:

Billing/Invoice Information	Turn Around Times	
Company: Un of S.C.	90 Min. ☐	48 Hours ☐
Contact: D. Washington	3 Hours ☐	72 Hours ☐
Address:	6 Hours ☐	96 Hours ☐
	12 Hours ☐	120 Hours ☐
	24 Hours ☑	144* Hours ☐

PO Number:
Project Name/Number: 100 - Cohen - 7th Floor

Asbestos Test Types	
PLM EPA 600/R-93/116	X
Positive stop	X
PLM Point Count	
PCM NIOSH 7400	
TEM AHERA	
TEM Level II	
TEM NIOSH 7402	
TEM Bulk Qualitative	
TEM Bulk Chatfield	
TEM Bulk Quantitative	
TEM Wipe ASTM D6480-99	
TEM Microvac ASTM D5755-02	
TEM Water EPA 100.2	
Other: _____	

Sample ID #	Description/Location	Volume/Area	Comments

Accepted ☑
Rejected ☐

Total # of Samples 35

Relinquished by	Date/Time	Received by	Date/Time
			9-10-04

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UNIVERSITY OF SOUTH CAROLINA

Building # #100 COKER - 7th Floor

Sample Analysis

Type of Analysis: Lead / Asbestos Date: 09-7-2012

Turn Around Time 24 HRS

Area	Sample ID	Material Sampled	Material Location	F/NF	Cond	Quantity	Pot to Disturb
A	1	BLACK 12 X 12 FLOOR TILE	COKER ROOM 709	NF	G	<200 SQ FT	LOW
A	2	BLACK 12 X 12 FLOOR TILE	COKER ROOM 709	NF	G	<200 SQ FT	LOW
A	3	BLACK 12 X 12 FLOOR TILE	COKER ROOM 709	NF	G	<200 SQ FT	LOW
B	4	YELLOW SHEET FLOORING	COKER ROOM 709	NF	G	3000 SQ FT	LOW
B	5	YELLOW SHEET FLOORING	COKER ROOM 709	NF	G	3000 SQ FT	LOW
B	6	YELLOW SHEET FLOORING	COKER ROOM 709	NF	G	3000 SQ FT	LOW
C	7	BLACK COUNTER TOPS	COKER ROOM 711	NF	G	<1000 SQ FT	LOW
C	8	BLACK COUNTER TOPS	COKER ROOM 709	NF	G	<1000 SQ FT	LOW
C	9	BLACK COUNTER TOPS	COKER ROOM 709	NF	G	<1000 SQ FT	LOW
D	10	2X2 CEILING TILE	COKER ROOM 709	F	G	<5000 SQ FT	LOW

License # 21534 FM# _____ Signature _____ Requestor _____

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Columbia, SC 29208
NTRusse@fmc.sc.edu

Fax # 803-777-3990

12/4/12

2 of 3
Coker

AREA	SAMPLE ID	MATERIAL SAMPLED	MATERIAL LOCATION	F/NF	COND	QUANTITY	POT TO DISTURB
D	11	2X2 CEILING TILE	COKER ROOM 709	F	G	<5000 SQ FT	LOW
D	12	2X2 CEILING TILE	COKER ROOM 709	F	G	<5000 SQ FT	LOW
D	13	2X2 CEILING TILE	COKER ROOM 709	F	G	<5000 SQ FT	LOW
D	14	2X2 CEILING TILE	COKER ROOM 709	F	G	<5000 SQ FT	LOW
D	15	2X2 CEILING TILE	COKER ROOM 709	F	G	<5000 SQ FT	LOW
E	16	2X2 CEILING TILE	COKER HALL WAY 7TH FLOOR	F	G	<5000 SQ FT	LOW
E	17	2X2 CEILING TILE	COKER HALL WAY 7TH FLOOR	F	G	<5000 SQ FT	LOW
E	18	2X2 CEILING TILE	COKER HALL WAY 7TH FLOOR	F	G	<5000 SQ FT	LOW
F	19	FIRE PROOFING	COKER ROOM 709	F	G	NA	LOW
F	20	FIRE PROOFING	COKER 7TH FLOOR HALL	F	G	NA	LOW
F	21	FIRE PROOFING	COKER 7TH FLOOR HALL	F	G	NA	LOW
G	22	PRE FAB WALL	COKER ROOM 714	F	G	<1000 SQ FT	LOW
G	23	PRE FAB WALL	COKER ROOM 709	F	G	<1000 SQ FT	LOW
G	24	PRE FAB WALL	COKER ROOM 712	F	G	<1000 SQ FT	LOW
H	25	JOINT COMPOUND	COKER ROOM 711	F	G	<5000 SQ FT	LOW
H	26	JOINT COMPOUND	COKER ROOM 709	F	G	<5000 SQ FT	LOW
H	27	JOINT COMPOUND	COKER ROOM 711	F	G	<5000 SQ FT	LOW

7/28/94

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UNIVERSITY OF SOUTH CAROLINA

Sample Analysis

Building # 100 COKER Type of Analysis: Lead / Asbestos Date: 09-1-2012 Turn Around Time 24 HRS

Area	Sample ID	Material Sampled	Material Location	F/NF	Cond	Quantity	Pot to Disturb
H	28	JOINT COMPOUND	COKER ROOM 709	F	G	<5000 SQ FT	LOW
H	29	JOINT COMPOUND	COKER ROOM 709	F	G	<5000 SQ FT	LOW
I	30	SHEETROCK	COKER ROOM 711	F	G	<5000 SQ FT	LOW
I	31	SHEETROCK	COKER ROOM 709	F	G	<5000 SQ FT	LOW
I	32	SHEETROCK	COKER ROOM 714	F	G	<5000 SQ FT	LOW
I	33	SHEETROCK	COKER ROOM 711	F	G	<5000 SQ FT	LOW
I	34	SHEETROCK	COKER ROOM 709	F	G	<5000 SQ FT	LOW
I	35	SHEETROCK	COKER ROOM 709	F	G	<5000 SQ FT	LOW
			TEM # 3 & # 6 by Negative				

License # 21534 FM# _____ Signature _____ Requestor _____

Send lab results in PDF format as soon as possible to:

Ed Pitts 803-777-3296
720 College St.
Columbia, SC 29208
EHP@fmc.sc.edu

Darryl Washington 803-777-2399
720 College St.
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Ty Russell 803-777-1208
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NTRusse@fmc.sc.edu

Fax # 803-777-3990

21482 21484

SECTION 11531 - LABORATORY FUME HOODS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes the following:

1. Bench-top laboratory fume hoods - standard.
2. Laboratory cup sinks and faucets in fume hoods.
3. Water, vacuum, laboratory gas, and electrical service fittings in fume hoods.
4. Piping and wiring within fume hoods for service fittings, light fixtures, blower switches, and other electrical devices.

1.03 FUME HOOD PERFORMANCE REQUIREMENTS

A. Fume hoods shall function as ventilated, enclosed workspaces, designed to capture, confine and exhaust fumes, vapors and particulate matter produced or generated within the enclosure.

B. Design fume hoods for consistent and safe air flow through the hood face. Negative variations of face velocity shall not exceed 20% of the average face velocity at any designated measuring point as defined in this section.

C. Average illumination of work area: Minimum 80 foot-candles. Work area shall be defined as the area inside the superstructure from side to side and from face of baffle to the inside face of the sash, and from the working surface to a height of 28 inches.

D. Fume hood shall be designed to minimize static pressure loss with adequate slot area and bell shaped exhaust collar configuration. Maximum average static pressure loss readings taken three diameters above the hood outlet from four points, 90 degrees apart, shall not exceed the following maximums with sash in full open position:

Face Velocity	Measured S.P.L. (W.G.)
60 F.P.M.	.15 inches
100 F.P.M.	.30 inches

E. Fume hood shall maintain essentially constant exhaust volume at any sash position for safety. Maximum variation in exhaust CFM, static pressure and average face velocity as a result of sash adjustment shall not exceed 5% for any sash position at the specified exhaust volume.

F. Fume hoods shall be available in standard widths of 4, 5, 6, 7 & 8-feet. Each size will have these depths available: 31.25", 37.25" & 43.25".

G. Noise Criteria: Test data of octave band analysis verifying hood is capable of a 50 NC value when connected to a 50 NC HVAC source. Reading taken 3' in front of open sash at 100 fpm face velocity.

H. Interior and exterior materials of construction and finishes shall meet the usage and this specification requirements.

1.04 LINER SURFACE FINISH PERFORMANCE REQUIREMENTS

A. Test procedure:

1. Test No. 1 – Spills and Splashes:
   a. Suspend in a vertical plane a 42" (horizontal) by 12" (vertical) panel divided into 3/4" wide vertical columns, each column numbered 1 through 49.
   b. Apply five drops of each reagent listed with an eye dropper.
   c. Apply liquid reagents at top of panel and allow to flow down full panel height. (CAUTION! Flush away any reagent drops.)
2. Test No. 2 – Fumes and Gases:
   a. Divide 24" x 12" panel into 2" squares, each square numbered 1 through 49.
   b. Place 25 milliliters of reagent into 100 milliliters beakers and position panel over beaker tops in the proper sequence. Note: Beaker pouring lip permits atmospheric oxygen to enter and participate in the reaction of the reagent fumes.
3. After 24 hours remove panel, flush with water, clean with naphtha and detergent, rinse, wipe dry and evaluate.

B. Evaluation ratings: Change in surface finish and function shall be described by the following ratings:
1. No Effect: No detectable change in surface material.
2. Excellent: Slight detectable change in color or gloss, but no change to the function or life of the work surface material.
3. Good: Clearly discernible change in color or gloss, but no significant impairment of work surface function or life.
4. Fair: Objectionable change in appearance due to surface discoloration or etch, possibly resulting in deterioration of function over an extended period.
5. Failure: Pitting, cratering or erosion of work surface material; obvious and significant deterioration.

C. Test Results: "P" Fume Hood Liner

REAGENT LIST	Test No. 1	Test No. 2
Concentrations by Weight	Rating Spills	Fumes
1. Sodium Hydroxide Flake	---	No Effect
2. Sodium Hydroxide, 40%	Excellent	No Effect

3. Sodium Hydroxide, 20%	Excellent	No Effect
4. Sodium Hydroxide, 10%	Excellent	No Effect
5. Ammonium Hydroxide, 28%	No Effect	No Effect
6. Eldorado - Plus (Solution)	No Effect	No Effect
7. Chloroform	Excellent	No Effect
8. LpH SE (Solution)	No Effect	No Effect
9. Trichloroethylene	Excellent	No Effect
10. Monochlorobenzene	Excellent	No Effect
11. Tincture of Iodine	Excellent	Excellent
12. Methyl Alcohol	No Effect	No Effect
13. Ethyl Alcohol	No Effect	No Effect
14. Butyl Alcohol	No Effect	No Effect
15. Phenol, 85%	Excellent	No Effect
16. Cresol	Excellent	No Effect
17. Sodium Sulfide, Saturated	Good	No Effect
18. Furfural	Fair	No Effect
19. Dioxane	No Effect	No Effect
20. Zinc Chloride, Saturated	No Effect	No Effect
21. Benzene	Excellent	No Effect
22. Toluene	Excellent	No Effect
23. Xylene	Excellent	No Effect
24. Gasoline	Excellent	No Effect
25. Naphthalene	Excellent	No Effect
26. Methyl Ethyl Ketone	Excellent	No Effect
27. Acetone	Excellent	No Effect
28. Ethyl Acetate	Excellent	No Effect
29. Amyl Acetate	Excellent	No Effect
30. Ethyl Ether	Excellent	No Effect
31. Silver Nitrate, 10%	Good	No Effect
32. Di Methyl Formamide	No Effect	Excellent
33. Formaldehyde, 37%	No Effect	No Effect
34. Formic Acid, 88%	No Effect	No Effect
35. Acetic Acid, Glacial	No Effect	No Effect
36. Dichloro Acetic Acid, 93%	Excellent	Excellent
37. Chromic Acid, Saturated	Good	No Effect
38. Phosphoric Acid, 85%	No Effect	No Effect
39. Sulfuric Acid, 33%	No Effect	No Effect
40. Sulfuric Acid, 77%	Excellent	No Effect
41. Sulfuric Acid, 93%	Good	No Effect
42. Hydrogen Peroxide, 30%	No Effect	No Effect
43. Acid Dichromate	Excellent	No Effect
44. Nitric Acid, 20%	Excellent	No Effect
45. Nitric Acid, 30%	Excellent	No Effect
46. 40 & 47 Equal Parts	Excellent	Good
47. Nitric Acid, 70%	Excellent	Good
48. Hydrochloric Acid, 37%	No Effect	Excellent
49. Hydrofluoric Acid, 48%	No Effect	Failure

1.05 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For laboratory fume hoods. Include plans, elevations, sections, details, and attachments to other work.

1. Indicate details for anchoring fume hoods to permanent building construction including locations of blocking and other supports. Include calculations demonstrating that anchorages comply with seismic performance requirements.
2. Indicate locations and types of service fittings together with associated service supply connection required.
3. Indicate duct connections, electrical connections, and locations of access panels.
4. Include roughing-in information for mechanical, plumbing, and electrical connections.
5. Show adjacent walls, doors, windows, other building components, laboratory casework, and other laboratory equipment. Indicate clearances from above items.
6. Include layout of fume hoods in relation to lighting fixtures and air-conditioning registers and grilles.
7. Include coordinated dimensions for laboratory equipment specified in other Sections.

C. Samples for Initial Selection: For factory-applied finishes, hood liner, epoxy sinks and epoxy resin fume hood countertops.

D. Samples for Verification: For factory-applied finishes interior lining and countertop material, in manufacturer's standard sizes.

E. Product Test Reports: Submit test reports on **each** size and type of hood verifying conformance to test performances based on evaluation of comprehensive tests according to SEFA 1.2, "Laboratory Fume Hoods--Recommended Practices" and ASHRAE 110 performed by manufacturer and witnessed by a qualified independent testing agency, for fume hoods. Test report must accompany **each** hood as part of installation and usage package

1.06 QUALITY CONTROL

A. Single source responsibility: Fume hood casework, work surfaces, and other laboratory equipment and accessories shall be manufactured or furnished by a single laboratory furniture company.

B. Manufacturer's qualifications: Modern plant with proper tools, dies, fixtures and skilled workmen to produce high quality laboratory casework and equipment, and shall meet the following minimum requirements:
1. Ten years or more experience in manufacture of laboratory casework and equipment of type specified.
2. Ten installations of equal or larger size and requirements. Provide contact at each.
3. UL 1805 Specification: (Mandatory)
Fume Hood must be Underwriters Laboratories subject 1805 classified. The 1805 standard covers electrical and mechanical hazards, investigates the

flammability of materials and measures the effectiveness of airflow characteristics. Proper labeling must be affixed to the face of each fume hood indicating classification to the UL 1805 standard for Laboratory Fume Hoods. UL listing covering electrical components only or other listings that do not encompass all issues covered in UL 1805 is insufficient. All factory testing shall be performed in a U.L. certified test facility.

C. Installer's qualifications: Factory certified by the manufacturer. Provide outline of certification program.

D. Product Designations: Drawings indicate sizes, types, and configurations of fume hoods by referencing designated manufacturer's catalog numbers. Other manufacturers' hoods of similar sizes, types, and configurations, and complying with the Specifications may be considered. Refer to Division 1 Section "Product Requirements."

E. Product Standard: Comply with SEFA 1.2, "Laboratory Fume Hoods—Recommended Practices."

F. Safety Glass: Products complying with testing requirements in 16 CFR 1201 for Category II materials.
1. Subject to compliance with requirements, permanently mark safety glass with certification label of Safety Glazing Certification Council or another certification agency acceptable to authorities having jurisdiction.

G. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

H. Instructions: Submit for review and approval
1. Instructions inscribed on instruction plate to be attached to hood.
2. Written instructions in booklet form providing additional details on safe and proper operation and maintenance.
3. Professional quality video - minimum 15 minutes in length on proper hood usage.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Schedule delivery of equipment so that spaces are sufficiently complete that equipment can be installed immediately following delivery.

B. Protect finished surfaces from soiling or damage during handling and installation. Keep covered with polyethylene film or other protective coating.

C. Protect all work surfaces throughout construction period with 1/4" corrugated cardboard completely covering the top and securely taped to edges. Mark cardboard in large lettering "NO STANDING".

1.08 PROJECT CONDITIONS

A. Do not deliver or install equipment until the following conditions have been met:

1. Windows and doors are installed and the building is secure and weather tight.
2. Ceiling, overhead ductwork and lighting are installed.
3. All painting is completed and floor tile located before casework is installed.

1.09 COORDINATION

A. Coordinate installation of fume hoods with laboratory casework, fume hood exhaust ducts, and plumbing and electrical work.

1.10 EXTRA MATERIALS

A. Furnish complete touchup kit for each type and color of fume hood finish provided. Include fillers, primers, paints, and other materials necessary to perform permanent repairs to damaged fume hood finish.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers
   1. Standard Hood: Subject to compliance with requirements, provide products by one of the following:
      a. Fisher Hamilton L.L.C. Concept Hood Series (Basis of Specification)
      b. Kewaunee Scientific Corporation; Laboratory Division.
      c. Labconco Corporation.

2.02 MATERIALS

A. Steel: High quality, cold rolled, mild steel meeting requirements of ASTM A366; gauges U.S. Standard and galvanized.

B. Stainless steel: Type 304; gauges U.S. Standard.

C. Ceiling closure panels: Minimum 18 gauge; finish to match hood exterior.

D. Downdraft bypass: Low resistant type, 18 gauge steel chamber, directional louvers – not acceptable. All bypass air shall enter top of bypass chamber and enter hood in a downflow direction. Chamber shall protect user from expelled particulate in the event of an adverse internal reaction.

E. Safety glass: 7/32" thick laminated safety glass.

F. Sash cables: Stainless steel, uncoated, 1/8" diameter military spec. quality. (MIL-W-83420D-3)

G. Sash guides: Corrosion resistant, extruded PVC.

H. Pulley assembly for sash chain: Finish bored steel drive sprockets and keyed drive, 1/2" dia. front connector shaft. Rear idler sprockets; double sealed ball bearings type, lubricated. All sprockets steel with zinc dichromate finish. (Nylon tired-not acceptable.)

I. Sash pull: Full width corrosion resistant steel with chemical resistant powder coating. Maximum 1.5" thick.

J. Gaskets: White 70 durometer PVC for interior access panels. Gasket interior access panels to eliminate air leakage and to retain liquids inside hood.

K. Fastenings:

1. Exterior structural members attachments: Sheet metal screws, zinc plated.
2. Interior fastening devices concealed. Exposed screws not acceptable. (Screw head caps" not acceptable.)
3. Exterior side access panel member fastening devices to be exposed corrosion resistant, non-metallic material, creating a positive mechanical latch. Latch must be flush type. Exposed screws or velcro type fasteners – not acceptable.

L. Instruction plate: Corrosion resistant or plastic plate attached to the fume hood exterior with condensed information covering recommended locations for apparatus and accessories, baffle settings and use of sash.

2.03 STANDARD FUME HOOD CONSTRUCTION

A. Superstructure: Rigid, self supporting assembly of double wall construction, maximum 4-7/8" thick.
1. Wall consists of a sheet steel outer shell and a corrosion resistant inner liner, and houses and conceals steel framing members, attaching brackets and remote operating service fixture mechanisms and services. Panels must be attached to a full frame construction, minimum 14 gauge galvanized members. Panels and brackets attached to eliminate screw heads and metallic bracketry from hood interior.
2. Access to fixture valves concealed in wall provided by exterior removable access panels, gasketed access panels on the inside liner walls, or through removable front posts.

B. Exhaust outlet: Rectangular with ends radiused, shaped and flanged, 18 gauge steel finished with Chameleon powder coating.

C. Access opening perimeter: Air foil or streamlined shape with all right angle corners radiused or angled. Bottom horizontal foil shall provide nominal one inch bypass when sash is in the closed position. Bottom foil shall not be removable without use of special tools. Bottom foil shall provide access area sufficient in size to pass thru hospital grade electrical plugs. Bottom foil: Steel with urethane powder coating to increase acid and abrasion resistance. Air foil and sill to be flush with the height of the work surface. A secondary containment trough shall be located in front of the work surface and extend below the airfoil sill.

D. Fume hood sash: (Vertical) Full view type with clear, unobstructed, side-to-side view of fume hood interior and service fixture connections. Sash to have a 35-inch sight line and a 28.5" vertical access height.
Bottom sash rail: 2" maximum, 18 gauge steel with powder coating finish. Provide integral formed, flush pull the full width of bottom rail. Full width extruded dual durometer bottom bumper and airflow control strip. Set safety glass into rails in deep form, extruded poly-vinyl chloride glazing channels available on constant volume and restricted bypass hoods

E. Counter balance system: Single weight, sprocket and chain, counter balance system which prevents sash tilting and permits ease of operation at any point along full width pull. Maximum 7 pounds pull required to raise or lower sash throughout its full length of operating sash opening. Design system to hold sash at any position without creep and to prevent sash drop in the event of cable failure. Life cycle test sash and weight. Provide independent test data. (See 2.02 F, G and H for material descriptions.) Open and close sash against rubber bumper stops.

F. Airfoil: The airfoil will be flush to the worksurface with ample room for electrical hospital grade cords to fit beneath the airfoil. This sill to be used on both Sash Types. Sill be ergonomically radiused on front edge. Sill must pivot forward to provide cord and trough access. Airfoil sills that are not flush with the top plane of the work surface are not acceptable.

G. Fume hood liner: Poly-resin (product number denoted by the suffix "P"): Reinforced polyester panel; smooth finish and white color in final appearance. Flexural strength: 14,000 psi. Flame spread: 15 or less per U.L. 723 and ASTM E84-80. Baffle must be same material as liner. Metallic baffles, brackets or supports on hood interior – not acceptable. Liner and baffle material must meet 1.03 performance test. Independent test validation is mandatory.

H. Baffles: Baffles providing controlled air vectors into and through the fume hood must be fabricated of the same material as the liner. Provide minimal exhaust slots full height on vertical sides of the baffle. High performance 2-piece baffle will be used. Baffle shall incorporate exhaust slots located to purge the upper and lower area of the hood. Baffle to be non-adjustable. Baffles with manual or automatic adjustment are not acceptable. Minimum depth of 19" for interior workspace is required at the extreme upper portion of the fume hood to provide maximum interior work area. All baffles, supports, and brackets to be non-metallic.

I. Auto-Sash: Sash shall be designed to promote usage as an upper body and face shield. Face velocities and volumes shall be based on an 18" operating opening. Sash shall have the capability to be raised to full 28.5" vertical opening for loading or unloading of large apparatus. A lock-open shall be provided. Sash shall lower automatically to the operating position when released from any position above 18". Auto-sash function shall be life cycle tested and not incorporate the need for motor drives. Submit third party validation of life cycle tests.

J. Epoxy Resin Cup Sinks: One piece molded epoxy resin with molded outlets with 1 ½" male threaded outlet for connection of traps (by others).

1. Size: Oval cupsink, nominal overall diameter 7 ¾" x 4 ¾".
2. Color: Black.

K. Service fixtures and fittings: Color coded washers at hose nozzle outlets and valves mounted inside the fume hood and controlled from the exterior with color coded index handles.

1. Valves: Needle point type with self-centering cone tip and seat of hardened stainless steel. Tip and seat shall be removable and replaceable.
2. Provide piping for all service fixtures from valve to outlet: Galvanized iron or copper for water, air and vacuum and black iron for gas services.
3. Fixtures exposed to hood interior: Brass with chemically resistant color coded powder coating.
4. Remote control handles: Black nylon four-arm handle with nylon color-coded index buttons.
5. Services: As shown or specified.
6. All outlets shall have detachable serrated nozzles.
7. All valves shall be front-loaded for ease of access and maintenance at point of use.
8. CW Faucets:
   a. Manufacturer: Broen Lab Division, Represented in North America by Laboratory Enterprises, Inc., Phone # 1-913-621-7337, Fax # 913-621-1827. Alternate manufacturers will be considered provided that they are certified by ISO 9001 to meet the requirements of the "Boss Line" by Broen Lab.
   b. Gooseneck: Water fixtures must be supplied with a field adjustable gooseneck for either partly swivel turn, 360 degrees, swivel turn or fixed in any desired location. Only double O-ring seal will be accepted.
   c. All goosenecks shall provide a ½" male outlet thread for attachment of aerators, serrated nozzles, aspirators, etc.
   d. Vacuum breaker must be integrated in gooseneck at all cupsink faucets.

L. Hood light fixture: Two lamp, rapid start, UL listed fluorescent light fixture with sound rated ballast installed on exterior of roof. Provide safety glass panel cemented and sealed to the hood roof.
1. Interior of fixture: White, high reflecting plastic enamel.
2. Size of fixture: Largest possible up to 48" for hoods with superstructures up to six feet. Provide two 36" fixtures for hoods with eight foot superstructures.
3. Include lamps with fixtures. Hoods without lamps – not acceptable.
4. Illumination: Per performance values, Part 1 of this Section.
5. Access to light thru lintel panel – no tools required.

M. Electrical services: Three wire grounding type receptacles rated at 120 V.A.C. at 20 amperes. Provide 250 V.A.C. receptacles where specified. Flush plates: Black acid resistant thermoplastic.

N. Work surfaces: 1-1/4" thick surface, dished a nominal 3/8" to contain spills.
1. Molded resin work surfaces for hoods with Poly-resin liners.

O. Safety Monitor/Alarm System:

Where shown or specified provide Safety Monitor/Alarm System which monitors face velocity and provides audible and visual alarm if face velocity drops below safe levels. The technology used in the 54L335 will be based on thermally compensated thermistor based in the alarm module. As the internal fume hood pressure changes as the sash opening is closed and opened, the flow passing over the thermistor is calibrated to a face velocity which is displayed on the front of the monitor.

1. Safety monitor: UL listed, tamper proof, with all alarm circuits, electric components, external tubing, and manifolds furnished complete and factory installed. The monitor shall have light emitting diode display which provides clear indication of airflow conditions.
2. Calibration is the responsibility of the owner and is required once the hood is stationed and the hood exhaust and room supply systems are balanced. A secondary calibration has been factory set into the alarm's memory only to determine that the alarm is functional and ready for shipment. **The primary calibration must be completed in the field.**
3. Airflow sensor: Thermally compensated glass-beaded thermistor, factory connected to a side-wall port on the interior of the fume hood.
4. Alarm Signal: Audible signal and a visual, red large light emitting diode:
   a. Silence pushbutton, which disables the audible alarm, shall be accessible on the front of the safety monitor.
   b. Provide alternate mode in which audible alarm is silenced indefinitely but visual alarm remains activated until the alarm condition is corrected.
   c. When alarm condition is corrected and face velocity and volume return to specified levels, the Safety Monitor will automatically reset and begin routine monitoring.
5. Provide test circuit to verify proper Safety Monitor operation.
6. Electrical rating: Maximum 12 VDC, and maximum current rating of 200MA.
7. Monitor shall indicate when sash is in the set-up position.

2.04 BYPASS FUME HOODS

A. Constant volume type with built-in automatic compensating bypass to maintain constant exhaust volume regardless of sash position.
B. Bypass: Positive in action and controlled by the sash operation.
C. Low resistance opening at top of front lintel panel. Bypass shall provide a smooth downflow effect.
D. As sash is lowered to 6”, bypass design shall limit the increase in face velocity to maximum of three times the average face velocity with the sash full open.
E. Width: 48"

2.06 METAL FINISH

A. Preparation: Spray clean metal with a heated cleaner/phosphate solution, pretreat with iron phosphate spray, water rinse, and neutral final seal. Immediately dry in heated ovens, gradually cooled, prior to application of finish.

B. Application: Electrostatically apply urethane powder coat of selected color and bake in controlled high temperature oven to assure a smooth, hard satin finish. Surfaces shall have a chemical resistant, high grade laboratory furniture quality finish of the following thicknesses:

1. Exterior and interior surfaces exposed to view: 1.5 mil average and 1.2 mil minimum.
2. Backs of cabinets and other surfaces not exposed to view: 1.0 mil average.
3. Color: to be selected from manufacturer's standard colors.

C. Chemical Resistance:
The basis for the finish performance test shall be SEFA (Scientific Equipment & Furniture Association) 8 1999 standards. The purpose of the chemical test is to evaluate the resistance a finish has to chemical spills.

PART 3 EXECUTION

3.01 INSTALLATION

A. Installation:
1. Install fume hoods and equipment in accordance with manufacturer's instructions.
2. Install equipment plumb, square, and straight with no distortion and securely anchored as required.
3. Secure work surfaces to casework and equipment components with material and procedures recommended by the manufacturer.

B. Accessory installation: Install accessories and fittings in accordance with manufacturer's recommendations.

3.02 FIELD QUALITY CONTROL TESTING OF FUME HOODS

A. Field testing requirements:
1. Perform tests in field to verify proper operation of the fume hoods before they are put in use, using only qualified personnel.
2. Perform tests after installation is complete, the building ventilation system has been balanced, all connections have been made, and written verification has been submitted that the above conditions have been met.
3. Verify that the building make-up air system is in operation, the doors and windows are in normal operating position, and that all other hoods and exhaust devices are operating at designed conditions.
4. Correct any unsafe conditions disclosed by these tests before request of test procedures.

B. Testing equipment:
1. Properly calibrated hot wire thermal anemometer equal to Alnor Model No. 8500D-1 Compuflow.
2. Supply of 30-second smoke bombs.
3. Supply of titanium tetrachloride.

C. Test procedure - SEFA LF-1-1991:
1. Check room conditions in front of fume hood using a thermal anemometer and a smoke source to verify that the velocity of cross drafts does not exceed 20% of the specified average fume hood face velocity. Eliminate any cross drafts that exceed these values before proceeding.

a. CAUTION: Titanium tetrachloride fumes are toxic and corrosive. Use sparingly; avoid inhalation and exposure to body, clothing and equipment that might be affected by corrosive fumes.
b. NOTE: No fume hood can operate properly if excessive cross drafts are present.

2. Perform the following test to verify conformance of actual fume hood face velocities to those specified. Turn on the exhaust blower with the sash in full open position. Determine the face velocity by averaging the velocity of six readings taken at the fume hood face: at the centers of a grid made up of three sections of equal area across the top half of the fume hood face and three sections of equal area across the bottom half of the fume hood face.
   a. If not in accordance with specifications, refer to manufacturer's troubleshooting Guide for aid in determining cause of variation in air flow.
3. Check sash operation by moving sash through its full travel. Verify that sash operation is smooth and easy, and that vertical rising sash shall hold at any height without creeping up or down.

D. Field testing of air flow in fume hoods without auxiliary air:
1. Turn fume hood exhaust blower on. With sash in the open position check air flow into the fume hood using a cotton swab dipped in titanium tetrachloride or other smoke source. Verify that air flow is into the fume hood over the entire face area by a complete traverse of the fume hood 6" inside the face. Reverse flow is evidence of unsafe conditions. Take necessary corrective actions and retest.
2. Move a lighted smoke bomb throughout the fume hood work area directing smoke across the work surface and against the side walls and baffle. Verify that smoke is contained within the fume hood and rapidly exhausted.

E. Field testing of air flow in fume hoods with auxiliary air:
1. Calculate exhaust volume from face velocity data as determined above. Determine face velocity and exhaust volume with the auxiliary air blower off, in accordance with SEFA LF-1.
2. With sash in the open position check air flow into the fume hood using a cotton swab dipped in titanium tetrachloride or other smoke source. Verify that air flow is into the fume hood over the entire face area by a complete traverse of the fume hood 6" inside the face. Reverse flow is evidence of unsafe conditions. Take necessary corrective actions and retest.
3. Ignite smoke bomb at the source of auxiliary air and observe the flow of smoke/air down the face and into the hood. Close sash and observe flow patterns. Verify that operation is safe and proper.
4. Move a lighted smoke bomb throughout the fume hood work area directing smoke across the work surface and against the side walls and baffle. Verify that smoke is contained within the fume hood and rapidly exhausted.

3.03 ADJUSTING

A. Repair or remove and replace defective work, as directed by [Architect] [Owner] upon completion of installation.

B. Adjust sash, fixtures, accessories and other moving or operating parts to function smoothly.

3.04 CLEANING

A. Clean equipment, touch up as required.

3.05 PROTECTION OF FINISHED WORK

A. Provide all necessary protective measures to prevent exposure of equipment from exposure to other construction activity.

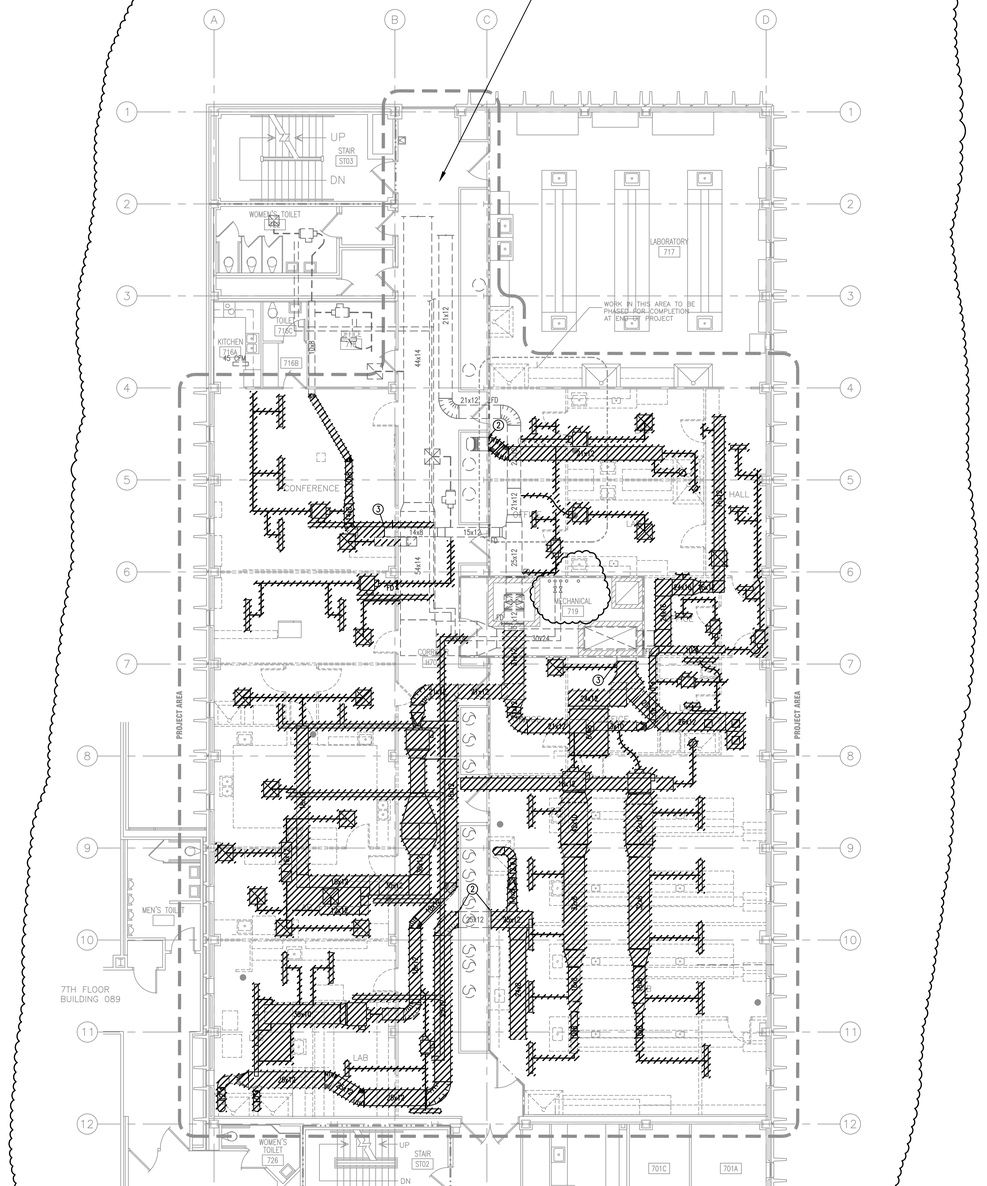
B. Advise contractor of procedures and precautions for protection of material and installed fume hoods from damage by work of other trades.

3.04 FUME HOOD ORIENTATION

A. Schedule and coordinate fume hood orientation including, maintenance review, recommended annual and semi-annual inspections, and recommended fume hood practices (to include the fume hood training video).

END OF SECTION 11531

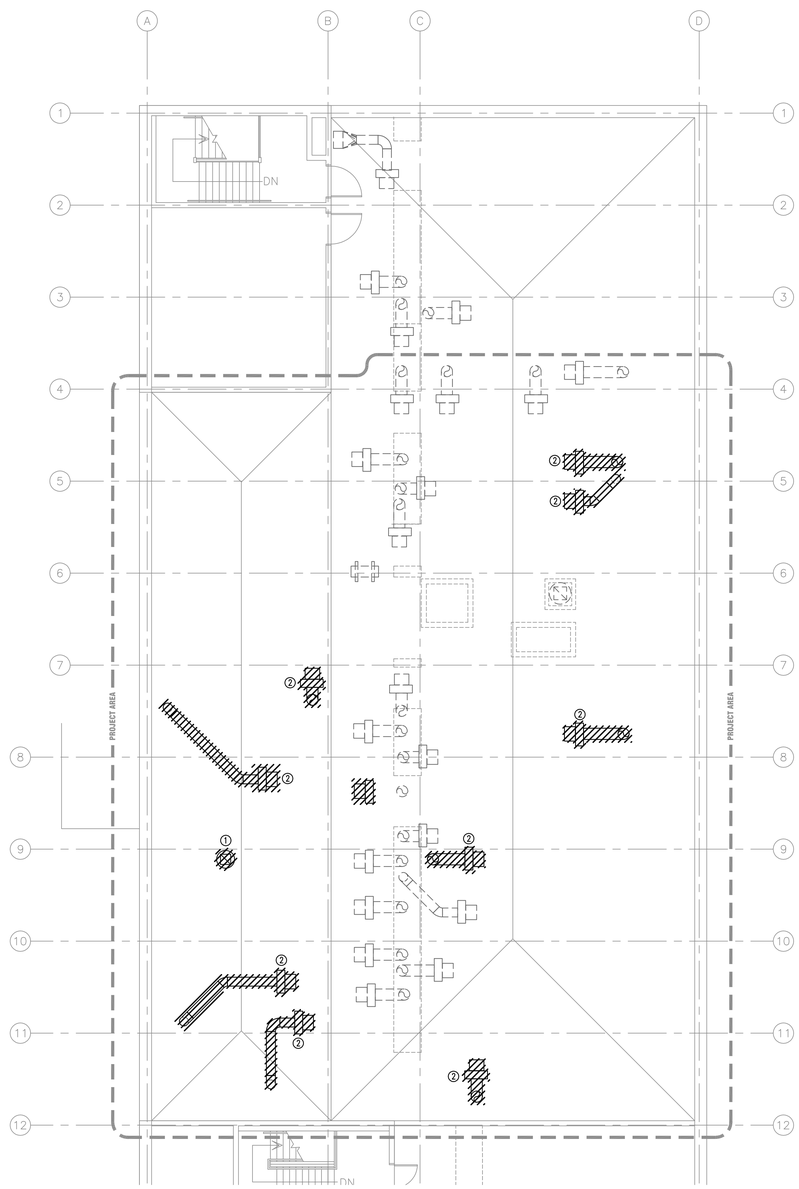
REFER TO AB-1 IN ADDENDUM FOR DUCTWORK DEMOLITION SCOPE OF WORK PROVIDED BY ABATMENT CONTRACTOR.



DEMOLITION NOTES:

1. REMOVE ALL DUCTWORK, GRILLES, CONTROLS, WIRING, TERMINAL BOXES, AND PIPING AS HATCHED ON PLAN.
2. REMOVE DUCT UP TO THIS POINT CAN CAP.
3. REMOVE DUCT UP TO THIS POINT. SEE SHEET M2.7 FOR ADDITIONAL INFORMATION.

1 PARTIAL SEVENTH FLOOR PLAN – HVAC DEMOLITION
1/8"=1'-0"



DEMOLITION NOTES:

1. REMOVE EXISTING EXHAUST FAN AND CAP EXISTING CURB.
2. REMOVE EXISTING EXHAUST FAN, DUCTWORK, SUPPORTS, ALL ASSOCIATED WIRING, CONTROL AND PATCH ROOF OPENING.

2 PARTIAL ROOF PLAN – HVAC DEMOLITION
1/8"=1'-0"

GMK ASSOCIATES, INC.
Design/Planning/Construction
1201 Main Street, Suite 2100
Columbia, S.C. 29201
tel. 803-256-0000
fax 803-255-7243

consultants

owner

UNIVERSITY OF SOUTH CAROLINA

project name
COKER - 7th FLOOR PHARMACY RENOVATION

State project number
H27- 6101

project number
12023.01

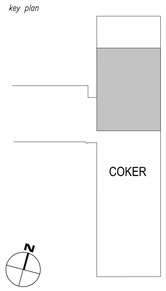
seals/signature

issued for
CONSTRUCTION

date
APRIL 23, 2013

number	item	date
1	ADDENDUM NO. 3	05/03/13

key plan



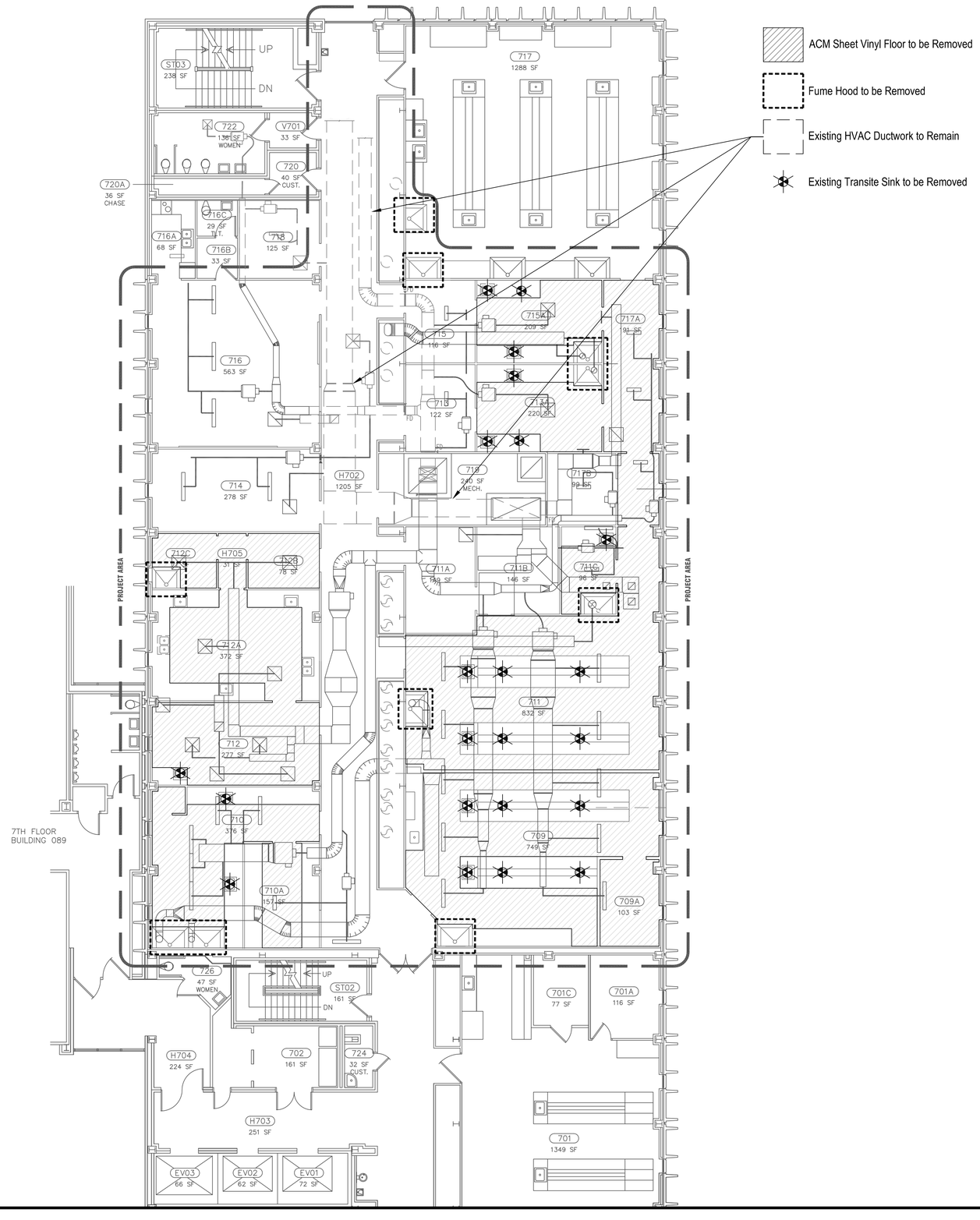
sheet title
PARTIAL SEVENTH FLOOR & ROOF PLAN - HVAC DEMOLITION

sheet number
M1.7

drawn by JDR
checked by JDR

ASBESTOS ABATEMENT GENERAL NOTES

1. Contractor shall thoroughly read all specifications and thoroughly review all construction documents prior to commencement of abatement activities.
2. Contractor is responsible for actual quantities associated with the abatement.
3. Mechanical systems shown on drawing are a general schematic depiction of existing HVAC components.
4. Contractor to coordinate all abatement activities with the GC to ensure that only building components to be removed (i.e. mechanical systems piping and ductwork) as part of the renovation within the project area are removed, and that those building components to remain are not removed or damaged.
5. All mastic on seams of fiberglass duct wrap insulation and associated metal ductwork found above suspended ceilings within the project area shall be removed , handled and disposed of as ACM. All fiberglass wrap insulation and metal ductwork shall be thrown away with mastic as ACM.
6. Mastic found on seams of non-insulated metal ductwork found above suspended ceilings shall to be removed along with the associated metal ductwork within the project area shall be removed, handled and disposed of as ACM. Metal ductwork shall be disposed of along with mastic as ACM.
7. Contractor is to be aware that lab countertops throughout the renovation area are non-ACM. However, lab sinks are Transite. Contractor shall dismantle lab counter so as not to damage these Transite sinks. Sinks shall be removed, handled and disposed of as ACM.
8. Fume hoods found throughout the project area are lined with Transite panels. Fume hoods shown to be removed shall be dismantled so as to access these panels for removal and disposal as ACM. Methods utilized to remove Transite panels shall not damage them. Removal of screws shall be deemed a friable abatement without a negative exposure assessment which must be submitted to the Owner and Owners representative for approval prior to the start of the abatement.



DRWN. BY: GME
CHKD. BY: JLS
APPR. BY: GME
NOTES:
1
2
3

ORIGINAL: 5/31/2013
REVISIONS:

SCALE 1/8" = 1'-0"

F&ME CONSULTANTS
GEOTECHNICAL - ENVIRONMENTAL - MATERIALS
COLUMBIA, SOUTH CAROLINA

ASBESTOS ABATEMENT PLAN
PARTIAL SEVENTH FLOOR LEVEL
University of South Carolina
Coker Life Science Building
7th Floor Pharmacy Renovation Project H27-6101
Prepared for: USC
Columbia, South Carolina

F&ME CONSULTANTS PROJECT NUMBER:
E5300.04

DRAWING NUMBER:
AB-1