

SECTION 020800 - ASBESTOS ABATEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this Section.
- B. Codes and Standards: Contractor shall be familiar with, and conform to, all of the provisions of the following documents.
  - 1. 23 Ill. Admin. Code 175 and 185
  - 2. Illinois Asbestos Abatement Act and Rules and Regulations, including all applicable amendments to date.
  - 3. 29 CFR 1926, including all applicable amendments to date.
  - 4. 29 CFR 1910, including all applicable amendments to date.
  - 5. The Asbestos Hazard Emergency Response Act, (AHERA), 40 CFR Part 763, 1987
  - 6. National Emissions Standards for Hazardous Air Pollutants (NESHAP) 40 CFR 61 Subparts A and M
  - 7. Guidance for Controlling Asbestos Containing Materials in Buildings, Appendix J, EPA Report No. 560/5-85-024
  - 8. American National Standard Practices for Respiratory Protection, ANSI Z88, American National Standards Institute, 1430 Broadway, New York, New York
  - 9. American National Standard Fundamentals Governing the Design and Operation of Local Exhaust Systems, ANSI Z9.2, American National Standards Institute, 1430 Broadway, New York, New York
  - 10. National Institute of Occupational Safety and Health, Manual of Analytical Methods (Method 7400)
  - 11. U.S. Environmental Protection Agency, Electron Microscope Measurement of Airborne Asbestos Concentrations, Report No. 600/2-77-178
  - 12. U.S. Environmental Protection Agency, Methodology for the Measurement of Airborne Asbestos by Electron Microscopy, Contract No. 68-02-3266
- C. Any requirements of these specifications shall in no way invalidate the minimum requirements of the preceding documents. Where the preceding documents, these specifications, Federal,

State, or local regulations conflict, the more stringent requirements shall apply.

- D. This specification and related drawings are issued as, and intended to be, a guide to the Contractor in the performance of his work. The Contractor is solely responsible to insure that the performance of his work complies fully with the U.S. EPA 40 CFR 61 Subparts A and M (NESHAP), 40 CFR Part 763 (AHERA), OSHA 29 CFR Parts 1910 and 1926, the Illinois Asbestos Abatement Act and Rules and Regulations, all current requirements of the Illinois Dept. of Public Health and any other applicable Federal, State or local statutes pertaining to this project. These regulations and statutes are deemed to be included in this specification the same as though written herein in full, and the Contractor shall include appropriate costs in his proposal.

#### 1.2 DEFINITIONS:

- A. *Abatement* means procedures to control fiber release from asbestos-containing materials. This includes removal, encapsulation, enclosure and repair.
- B. *Asbestos* means naturally occurring hydrated mineral silicates separable into commercially used fibers--specifically chrysotile, amosite, crocidolite, tremolite, anthophyllite, and actinolite
- C. *Asbestos-Containing Material (ACM)* means material composed of asbestos of any type and in an amount greater than 1% by weight either alone or mixed with other fibrous or nonfibrous materials.
- D. *Asbestos-Containing Waste Material* means asbestos-containing material or asbestos-contaminated objects requiring disposal pursuant to Section 855.475 of the Illinois Asbestos Abatement Act.
- E. *Asbestos Materials* means materials formed by mixing asbestos fibers with other products (including but not limited to rock wool, plaster, cellulose, clay, vermiculite, perlite and a variety of adhesives), and which contain more than 1% asbestos by weight. Some of these materials may be sprayed on surfaces or applied to surfaces in the form of plaster or a textured paint.
- F. *Work Area(s)* means designated rooms, spaces, or areas of the project where asbestos abatement will be performed.

#### 1.3 DESCRIPTION OF WORK:

- A. The following is a general description of the work required by the bid package. The IDPH-Licensed Asbestos Abatement Contractor shall include all of the following work in his proposal for work in Cicero School District 99 buildings. Contractor performing work at Columbus East School shall also be a qualified mold remediation contractor. Bidders shall review the contract documents and provide all work normally associated with their particular scope.
1. Columbus East Elementary School: Furnish all labor, materials, services, insurance, equipment, etc. to complete the following work at Columbus East Elementary School, 3100 South 54<sup>th</sup> Avenue, Cicero, IL 60804. Erect three full containments and remove the

following materials using gross wet removal methods. Site work is to begin June 11, 2013, provided no emergency days are used by the Owner. The building will be available for work 7 days per week, from 7 am to 11 pm. Contractor shall substantially complete asbestos abatement and demolition of Phase 1 (1st Floor East) within 9 calendar days (exclusive of holidays) of starting Phase 1. Contractor shall substantially complete asbestos abatement and demolition of Phase 2 (1st Floor West) within 13 calendar days (exclusive of holidays) of starting Phase 1. Contractor shall substantially complete asbestos abatement and demolition of Phase 3 (2<sup>nd</sup> and 3<sup>rd</sup> Floors) within 20 calendar days (exclusive of holidays) of starting Phase 1. Refer to Mold Remediation Section 020860 and Drawings AA1.01-CLE, AA1.02-CLE, AA1.03-CLE, AA2.01-CLE, and AA3.01-CLE for additional requirements.

- a. Suspended ceiling and soffit in first floor corridor, 106 (Women's Faculty), 116 and 131. Ceiling is contaminated by ACBM pipe insulation debris. Area is approximately 3,335 sq. ft.
- b. ACBM pipe insulation in first floor corridor, 101, storage room south of 106 (Faculty Lounge), 106 (Women's Faculty Toilet), 114 Toilet, 116, 122, 125, and 131. Quantity is approximately 585 lin. ft. ACBM includes mag (15-25% Chrysotile) and wool felt (5-30% Chrysotile) pipe insulation and pipe joint cement (15-25% Chrysotile).
- c. ACBM mastic for wall panels in first floor corridor, Stair 3 on Floors 1, 2, and 3, Stair 4 on Floor 2, Rooms 101, 102, 105, 106 (Faculty Lounge), 106 (Women's Faculty Toilet), 107, 108, 109, 110, 111, 112, 112A, 112B and adjacent corridor, 113, 114, 114 Toilet, 121, 123, and 132. Quantity is approximately 5,060 sq. ft. ACBM mastic for wall panels contains 3-13% chrysotile.
- d. Assumed ACBM mastic for chalkboards and tackboards mastic in Rooms 101, 102, 108 and 114. Quantity is approximately 150 sq. ft.
- e. Doors and windows with ACBM window glazing compound (1-3% chrysotile) in Stairs 1, 2, and 3 on 1<sup>st</sup> Floor, Rooms 101, 102, 121, 105, 106, 107, 109, 110, 111, 112, 112A, 112B and adjacent corridor, and 113. Quantity is approximately 5 smoke barriers, 18 doors and 3 windows.
- f. ACBM transite panels (2-7% chrysotile) on 4 smoke barriers at Stairs 2 and 3 on 1<sup>st</sup> Floor.
- g. Door frames with ACBM caulk (1.5-3% chrysotile) at on five smoke barriers at Stairs 1, 2, and 3 on 1<sup>st</sup> Floor.
- h. ACBM floor tile and mastic over concrete subfloor in 1<sup>st</sup> floor corridor, Rooms 101, 102, 105, 107, 108, 109, 110, 112, 112A, 112B and adjacent corridor, 113, 114 toilet, 116 vestibule, 123, 131, stairs from 1<sup>st</sup> floor to gym lobby, stairs from gym lobby to 2<sup>nd</sup> floor, gym lobby, 308, 308A, 311, 311A, and north and west corridors on 2<sup>nd</sup> and 3<sup>rd</sup> floors. Quantity is approximately 9,970 sq. ft. 9"x9" floor tile contains 1-10% chrysotile. Mastic for 9"x9" floor tile contains 4% chrysotile. Tile is in two layers in 107, 113, and 123. Tile is covered by carpet or plywood and floor tile in the gym lobby. Tile is covered by plywood and non-ACBM floor tile and mastic in the north and west corridors on 2<sup>nd</sup> and 3<sup>rd</sup> floors.
- i. ACBM 9"x9" floor tile and mastic and non-ACBM wire-reinforced lightweight concrete and felt paper over wood subfloor in original building 2<sup>nd</sup> and 3<sup>rd</sup> floor south corridors and Rooms 201, 202, and 304. Quantity is approximately 3,650 sq. ft. 9"x9" floor tile contains 1-10% chrysotile. Mastic for 9"x9" floor tile contains 4% chrysotile. Tile is covered by plywood and non-ACBM floor tile and mastic in the south corridors on 2<sup>nd</sup> and 3<sup>rd</sup> floors.

- j. Mold-impacted wall and floor materials in first floor corridor, lower landing of Stair 1, and Rooms 101, 102, 105, 106 (Faculty Lounge), 106 (Women's Faculty Toilet), 107, 108, 109, 110, 111, 112, 112A, 112B and adjacent corridor, 113, 114, 114 Toilet, 123, 124, and 132. Materials include, but are not limited to, wall panels, plaster, drywall, wood lath, wood framing, and wood sleepers.
  - k. Demolition of abandoned pipe above the ceiling in the 1<sup>st</sup> floor corridor.
  - l. Demolition of non-ACBM ceiling, wall and floor materials throughout the 1<sup>st</sup> floor.
  - m. Demolition of wood finish flooring following asbestos abatement in 2<sup>nd</sup> and 3<sup>rd</sup> floor corridors and Rooms 201, 202, 304, 308 and 311.
2. Roosevelt Elementary School: Furnish all labor, materials, services, insurance, equipment, etc. to complete the following work at Roosevelt Elementary School, 1500 South 50<sup>th</sup> Avenue, Cicero, IL 60804. Build and maintain a decontamination area. **Remove ACBM floor tile and mastic using non-friable (heat) removal methods. Refer to Drawing AA1.01R for additional requirements.**
    - a. **ACBM floor tile and mastic over concrete subfloor in Rooms 223 and 323. Quantity is approximately 50 sq. ft. 9"x9" floor tile contains 1-10% chrysotile. Mastic for 9"x9" floor tile contains 4% chrysotile.**
    - b. Build and maintain a decontamination area consisting of one chamber with Z-flaps for other trades working in the contaminated crawlspace at a location to be determined by Construction Manager. Provide and maintain a HEPA vacuum to be used by other trades. Maintenance shall be performed daily when work occurs in the crawlspace.
  - B. Refer to Bid Form of this Project Manual and Drawing(s) for additional information regarding the scope of work.
  - C. Protection of Existing Work to Remain: Perform the Work without damage to, or contamination of, adjacent work. Where such work is damaged or contaminated, restore to original condition.

#### 1.4 INSPECTION:

- A. Prior to commencement of the Work, inspect all areas in which work will be performed. Photograph existing conditions of surfaces, equipment, furnishings, or surrounding properties which could be misconstrued as damage resulting from the Work. File this documentation with the Asbestos Project Manager prior to starting work.

#### 1.5 JOB CONDITIONS:

- A. Occupancy: The Owner will occupy areas of the building not indicated for abatement work. Conduct work in manner that will minimize need for disruption of Owner's operations. Provide minimum of 72 hours advance notice to Asbestos Project Manager of work activities which will severely impact Owner's or contractors' operations. Refer to Division 0 sections of this Project Manual for additional information about work schedules and building occupancy.
- B. Condition of Structures: Owner assumes no responsibility for actual condition of items or structures adjacent to, or affected by the Work.

- C. Damages: Promptly repair damages caused to all adjacent facilities at no cost to Owner.
- D. Traffic: Conduct all Work, including disposal operations, in a manner to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities.
  - 1. Do not close, block or otherwise obstruct streets, walks or other occupied or used facilities without written permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
- E. Utility Services: Maintain existing utilities indicated to remain, keep in service, and protect against damage during Work operations.
  - 1. Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to governing authorities.

#### 1.6 QUALITY ASSURANCE:

- A. Permits and Notifications: Secure necessary permits in conjunction with the Work, asbestos abatement, transporting, and disposal, and provide timely notification of such actions as may be required by Federal, State, County and local authorities.
  - 1. Send written notification in accordance with IDPH, Part 855.350 and with 40 CFR Part 61.146 of Subpart M, to the appropriate Federal or State air pollution control agencies responsible for the enforcement of the National Emission Standard for Asbestos at least ten (10) working days prior to the commencement of any on-site project activity. Written permission from the Building Owner/Management confirming the authorization for the commencement of abatement shall be attached to the notification form. The Contractor shall provide the Asbestos Project Manager with a copy of the notice.
  - 2. Notify Cook County Department of Environmental Control and provide copies of notification to Asbestos Project Manager at least 10 working days prior to commencement of work at the job site (or a greater time period as may be required).
  - 3. Where regulations and statutes require interpretation, submit matters to the appropriate administrative agency for resolution prior to commencement of work. Proceed with work following notification of Asbestos Project Manager and approval by Owner.
- B. The Asbestos Abatement Contractor shall be experienced in asbestos abatement, and familiar with all Federal, State, County and local regulations as well as with state-of-the-art abatement techniques, equipment and safety procedures.
  - 1. The Contractor shall be licensed for asbestos abatement work by the Illinois Department of Public Health.
  - 2. Contractor shall have a job superintendent who has attended and passed a State approved

training course covering supervision of asbestos abatement projects. Superintendent shall be fluent in the English language and shall be available at all times when work involving this contract is in progress, and shall be experienced with asbestos abatement work and familiar with, and enforce the use of, all safety procedures and equipment. He shall be knowledgeable, of EPA, OSHA, NIOSH, and State requirements and guidelines as a minimum requirement. Substantiation of Superintendent's qualifications and familiarity with asbestos abatement work shall be available upon request, including a valid State of Illinois Asbestos Supervisor license.

3. During the entire abatement process, the Superintendent and/or one or more State licensed foremen shall be inside the work area.
  4. Supervisory personnel shall comply with all EPA, OSHA, State, and Local regulations, and prudent abatement practices.
  5. Workers shall comply with all EPA, OSHA, State, and local regulations, with prudent abatement practices, and shall be licensed by the State of Illinois Department of Public Health.
  6. Contractor shall provide proof of medical examination for all employees. Examinations will include items required by OSHA 29 CFR 1926.1101.
- C. The Owner will directly employ an independent Asbestos Project Manager accredited and/or certified as knowledgeable of any applicable laws or codes of the local authority having jurisdiction. The Asbestos Project Manager will act as the Owner's Representative for all specified asbestos abatement activities, unless otherwise noted in Contract Documents, and will monitor the work during its progress as to quality and completeness. Contractor will be advised at any time if a question arises as to compliance with standards of quality and/or completeness of the work, and Contractor shall use his best efforts to resolve any such questions as to compliance with standards of quality and/or completeness of work.
1. The Asbestos Project Manager will be present, on site, during all asbestos abatement activities and shall:
    - a. Enforce the Contract Documents.
    - b. Review and maintain Contractor submittals.
    - c. Review work progress daily.
    - d. Make determinations for adjustment of procedures as herein specified to suit field conditions in consultation with the Project Designer.
  2. The Asbestos Project Manager will have the authority to stop any job activities not performed in accordance with Contract Documents. Violations will be reported to the Owner with a description of the activity, reason for stoppage and possible means for correcting the problem.

3. The Asbestos Project Manager will keep a daily log of on-site observations concerning Contractor's compliance with Contract Documents. This log will be legible and made available upon request at all times to the Owner, Asbestos Project Designer, Contractor, and appropriate Federal, State and local authorities having jurisdiction.
  4. The Asbestos Project Manager will compile a comprehensive final report consisting of daily logs, observations and air monitoring results, and submit this report to the Owner, Contractor and the Illinois Dept. of Public Health within sixty working days following final clearance testing.
- D. The Owner will directly employ an Air Sampling Professional from an independent testing laboratory for background, area, and final clearance air testing. Air monitoring will be performed according to the requirements of the Illinois Dept. of Public Health Rules and Regulations and the results of analysis will be available onsite within 24 hours of collection.
1. Air Sampling is defined as the process of measuring the fiber content of a known volume of air collected during a specific period of time. The procedure utilized will be Phase Contrast Microscopy (PCM) analysis, in accordance with the NIOSH (National Institute for Occupational Safety and Health CDC, Building J N.E. Room 3007, Atlanta, GA 30333) Standard Analytical Method for Asbestos in Air Method 7400. In addition, transmission electron microscopy methods may be utilized for lower detectability and specific fiber identification.
  2. The Owner's independent testing laboratory will have an Air Sampling Professional performing the following air monitoring activities every day and every work shift of the abatement process.
    - a. Background level monitoring will be performed prior to the start of abatement activities in order to determine airborne fiber concentrations inside and outside the work area and the building. Samples will be obtained both in areas where abatement will occur and areas where abatement will not occur, to establish existing ambient air levels.
    - b. Daily monitoring will take place once abatement activities begin. The following number of samples will be considered minimums.
      - 1) Two area samples outside the work area in uncontaminated areas of the building including one at the entrance to the worker decontamination enclosure.
      - 2) One area sample at the exhaust of negative pressure ventilation equipment.
      - 3) Two area samples inside the work area.
      - 4) One personal sample inside the work area.
  3. Clearance Air Monitoring is defined as the employment of aggressive sampling techniques (sampling by which the person collecting the air sample creates activity during the sampling period to stir up settled dust and to simulate a degree of activity

typical of normal conditions in that area) to determine the airborne concentration of residual fibers upon conclusion of an asbestos abatement project. Clearance monitoring will be conducted by Owner's Air Sampling Professional following the final cleaning of the Work Area.

- a. A minimum of five samples shall be collected inside the work area(s) as required in 40 CFR Part 763.
- b. Clearance air monitoring will be performed according to AHERA rules. Wherever the quantity of ACM planned for removal has a surface area amount greater than 160 sq. ft., or a length greater than 260 feet, the transmission electron microscopy (TEM) analytical method for clearance air monitoring will be employed.
- c. Wherever the quantity of ACM planned for removal has a surface area amount less than 160 sq. ft., or a length less than 260 feet, the PCM analytical method for clearance air monitoring may be employed.
- d. Areas requiring the TEM analytical method: The area shall not be released from the Contractor to the building occupants until airborne asbestos fiber concentrations is no greater than 70 structures per square millimeter ( $70 \text{ s/mm}^2$ ) or the airborne asbestos concentration inside the abatement area is determined to be no higher than at locations outside the abatement area as determined by TEM, AHERA analytical method as defined in 40 CFR Part 763 Appendix A to Subpart E.
- e. Areas using the PCM analytical method: The area shall not be released from the Contractor to the building occupants until airborne fiber concentrations are found to be no greater than 0.01 fibers per cubic centimeter (f/cc).
- f. Tent containments: Where multiple tent containments each contain ACM quantities less than 160 square or 260 linear feet, but the *aggregate* of ACM removed from all tent containments has a surface area amount greater than 160 square or 260 linear feet, one of the following sampling protocols shall be selected.
  - 1) TEM protocol: A minimum of one TEM sample shall be collected in each tent containment. A minimum of five inside samples shall be collected altogether. The containments shall be released if the average of the samples collected is no greater than  $70 \text{ s/mm}^2$ .
  - 2) Combined PCM/TEM protocol: A minimum of one PCM sample shall be collected in each tent containment. A minimum of five inside samples shall be collected altogether. If any sample result is greater than 0.01 f/cc, recleaning and retesting shall be performed. If no sample exceeds 0.01 f/cc, a minimum of five TEM samples shall be collected from the locations which have the highest PCM sample results. The containments shall be released if the average of the samples collected is no greater than  $70 \text{ s/mm}^2$ .
- g. In the event any set of clearance samples obtained results in a fiber count greater than specified, the area will be recleaned according to IDPH requirements and



retested for clearance. All costs for recleaning and retesting including the costs for additional work by the Asbestos Project Manager and Air Sampling Professional shall be incurred by the Contractor. If a TEM clearance fails, the contractor has the option of requesting analysis of outside samples for comparison with the inside samples. The Owner will pay the analysis costs for clearance sampling that meets clearance criteria.

- h. The Owner's TEM analysis laboratory will provide results of TEM analysis within 6 normal business hours of obtaining samples. PCM analysis of daily air sampling and clearance monitoring will be performed on-site.

#### 1.7 SUBMITTALS:

- A. Schedule: Submit schedule indicating proposed methods and sequence of all Work Area operations to Asbestos Project Manager (and to governing authorities having jurisdiction as required) for review prior to commencement of work. Include in plan for the building: means of egress for emergency; interface of trades involved in related construction; sequence of work; disposal plan; type of wetting agent and lock-down, penetrating and bridging encapsulants to be used; detailed description of method to be employed to control pollution; and coordination for all shut-offs and continuation of utility services as required.
- B. Notify Asbestos Project Manager and/or Owner's air monitoring laboratory not less than 3 working days prior to start of any asbestos abatement related work.
- C. Five days prior to commencement of work, submit proof satisfactory to the Building Owner/Management and Asbestos Project Manager that required permits, site location and arrangements for transport and disposal of asbestos containing waste materials have been made. Obtain and submit a copy of handling procedures and list of protective equipment utilized for asbestos disposal at the landfill, signed by the landfill Owner/Management.
- D. Five days prior to commencement, submit documentation satisfactory to the Building Owner/Management and Asbestos Project Manager that the Contractor's employees, including foremen, supervisors, and any other company personnel or agents who may be exposed to airborne asbestos fibers or who may be responsible for any aspects of abatement activities, have received and maintained valid licenses and current training accreditation certificates.
- E. Submit documentation from a physician that all employees or agents who may be exposed to airborne asbestos in excess of background levels have been provided with the opportunity to be medically monitored to determine whether they are physically capable of working while wearing the required respirator without suffering adverse health effects. In addition, document that personnel have received medical monitoring as required in OSHA 29 CFR 1910.1001(j). The Contractor must be aware of and provide information to the examining physician about unusual conditions in the workplace environment (e.g. high temperatures, humidity, chemical contaminants) that may impact on the employees' ability to perform work activities.
- F. Five days prior to commencement, submit to the Building Owner/ Management and Project Manager, shop drawings for layout and construction of decontamination enclosure systems and barriers for isolation of the work area as detailed in this specification and required by applicable

regulations.

- G. With the Building Owner/Management, inspect the premises wherein all abatement related activities will occur and submit a statement signed by both, agreeing on building and fixture condition prior to the commencement of work.
- H. Submit manufacturer's certification that HEPA vacuums, negative pressure ventilation units, and other local exhaust ventilation equipment conform to ANSI Z9.2.
- I. When rental equipment is to be used in abatement areas, or to transport asbestos contaminated waste, a written notification concerning intended use of the rental equipment must be provided to the rental agency with a copy submitted to the Building Owner/Management. If no rental equipment will be used, Contractor shall provide a letter stating so.
- J. Document NIOSH approvals for all respiratory protective devices utilized on site. Include manufacturer certification of HEPA filtration capabilities for all cartridges and filters.
- K. Submit documentation of respirator fit-testing for all Contractor employees and agents who must enter the work area. This fit-testing shall be in accordance with qualitative procedures as detailed in the OSHA Respiratory Protection Standard 29 CFR 1910.134, Appendix A: Fit Testing Procedures (Mandatory).
- L. Five days prior to commencement, submit results of materials testing as conducted before the abatement for purposes of utilization during abatement activities.
- M. Submit Certificates of Insurance and name, as additional insured on their general liability coverage: a) the Owner, and b) RCM Laboratories, Inc., its subsidiaries, and its officers and directors.
- N. During Abatement activities the Contractor shall submit the following items to the APM:
  - 1. Prepare weekly job progress reports detailing abatement activities. Include review of progress with respect to previously established milestones and schedules, major problems and action taken, injury reports, and equipment breakdown.
  - 2. Submit copies of all transport manifests, trip tickets and disposal receipts for all asbestos waste materials removed from the work area during the abatement process.
  - 3. Submit daily copies of worksite entry logbooks with information on worker and visitor access.
  - 4. Submit logs documenting filter changes on respirators, HEPA vacuums, negative pressure ventilation units, and other engineering controls.
  - 5. Submit weekly copies of documentation that each asbestos workers present and in the abatement area were licensed as such by IDPH.
  - 6. Post in the clean room area of the worker decontamination enclosure a list containing the

names, addresses, and telephone numbers of the Contractor, the Building Owner/Management, the Asbestos Project Manager, the General Superintendent, the Air Sampling Professionals, the testing laboratory and any other personnel who may be required to assist during abatement activities (e.g. Safety Officer, Building Maintenance Supervisor).

## PART 2 - PRODUCTS

### 2.1 EQUIPMENT:

- A. Respiratory Equipment: Respiratory protection shall conform to standards set forth in 29 CFR 1926 and 1910, and shall be approved by the National Institute for Occupational Safety and Health (NIOSH). The formula used to determine the maximum exposure level is 0.1 f/cc multiplied by the Protection Factors listed in Table 1 of 29 CFR 1926.1101. The highest acceptable exposure levels are shown below. Workers shall don a more protective respirator if air monitoring results on this project exceed the acceptable exposure level for their respirators. Workers may select powered air-purifying respirators in lieu of air-purifying respirators at any time.

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|-------------|--|
| 1.0 f/cc:   | Half-mask air purifying respirator with HEPA filters                       |
| 5.0 f/cc    | Full-face air purifying respirator with HEPA filters                       |
| 100.0 f/cc  | Full-face powered air purifying respirator with HEPA filters               |
| 100.0 f/cc  | Full-face supplied-air respirator in continuous-flow mode                  |
| 100.0 f/cc  | Full-face supplied-air respirator in pressure-demand mode                  |
| >100.0 f/cc | Full-face supplied-air respirator in pressure-demand mode with SCBA backup |

1. All respiratory protection shall be provided to workers in conjunction with a written respiratory protection program which shall meet the requirements of OSHA regulation, 29 CFR 1910. Contractor shall identify all airborne contaminants to which his employees may be exposed and take the appropriate measures to protect his employees in accordance with all applicable regulations.
2. Respiratory protection shall be worn by ALL persons who enter the Work Area from the initiation of the Asbestos Abatement project until the area has been given clearance.
3. Contractor shall be required to provide, at a minimum, Powered Air-Purifying Respirators (PAPR) equipped with HEPA filter, and tight fitting full facepieces for all employees within a regulated area where removal of asbestos containing materials occurs, and in all areas in which fiber counts exceed the highest acceptable exposure level listed in 020800 2.1) A) for half-mask air purifying respirator with HEPA filters.
4. Half face air-purifying respirators may be worn during preparation and final cleaning activities when airborne fiber counts are consistently below 0.1 fibers/cc.
5. Filter Cartridges: Provide, at a minimum, HEPA type filters labeled with NIOSH and MSHA Certification for "Radionuclides, Radon Daughters, Dust, Fumes, Mists including Asbestos-Containing Dusts and Mists" and color coded in accordance with ANSI Z88.7

- (1980). These are equivalent to N100, R100, and P100 particulate filters described in NIOSH Standard 42 CFR 84. If employees will be exposed to oil aerosol, Contractor shall supply R100 or P100 filters.
- a. Contractor shall determine the appropriate filters to protect employees from solvents during floor tile mastic removal activities, and shall require his employees to wear them. These filters shall be designed to operate in conjunction with HEPA or 100 filters.
6. Supply a sufficient quantity of respirator filters approved for asbestos, so that workers can change the filters during the work day. Require that respirators be wet-rinsed each time a worker leaves the work area. Store respirators and filters at the job site in the changing room and protect totally from exposure to asbestos prior to their use.
- B. Personal Protective Clothing is defined as disposable protective whole-body clothing, head coverings, hand protection, and foot coverings. Hand protection may be disposable plastic or rubber gloves; cloth gloves may be worn inside plastic or rubber gloves for comfort, but shall not be used alone. Make sleeves secure at wrists and make foot coverings secure at ankles by use of tape.
1. Protective clothing shall be worn by ALL persons who enter a Work Area.
  2. Protective clothing shall be worn during performance of all cleaning activities.
  3. Non-disposable footwear or clothing shall remain in the work areas and shall be disposed of as contaminated material when the job is completed.
- C. Boots: Provide work boots with non-skid soles, and where required by OSHA, foot protectives, for all workers. Provide boots at no cost to workers. Rubber boots may be cleaned at completion of work and taken offsite. Do not allow non-cleanable boots to be removed from the work area for any reasons, after being contaminated with asbestos-containing material. Dispose of non-cleanable boots as asbestos contaminated waste at the end of the job.
- D. Hard Hats: Contractor shall determine whether head protectives (hard hats) are required by OSHA, and if so, shall provide them for all workers. Require hats to remain in the work areas throughout the work. Thoroughly clean, decontaminate and bag hats before removing them from work areas at the end of the job.
- E. Extra Equipment: Contractor shall make available respiratory equipment and personal protective clothing for Owner's laboratory and Asbestos Project Manager for entrance to any work area, and shall assume compliance with all applicable health and safety requirements.
- F. HEPA Filter is defined as a high efficiency particulate air filter capable of trapping and retaining 99.97 percent of particles (asbestos fibers) greater than 0.3 micrometers in mass median aerodynamic equivalent diameter, with an efficiency designation of 100 under NIOSH, 42 CFR 84, Respiratory Protective Devices.

1. HEPA vacuum equipment shall be fitted with HEPA filters.

## 2.2 NEGATIVE PRESSURE VENTILATION SYSTEMS:

- A. Negative Pressure Ventilation Systems shall be provided and equipped with HEPA filters to maintain a constant, low velocity airflow into contaminated work areas from adjacent uncontaminated areas, thus creating a negative pressure differential between the two areas. Contractor shall use a manometer with a strip chart for 24 hour (constant) recording, or contractor's supervisor shall record the reading on an hourly basis in his log. Manometer shall be calibrated at 0.02" water column.
- B. Before Start of Work: Submit design of pressure differential system to the Asbestos Project Manager for review. Include in the submittal at a minimum:
  1. Number of HEPA filtered fan units required and the calculations necessary to determine the number of machines
  2. Description of projected air flow within the Work Area and methods required to provide adequate air flow in all portions of the work area
  3. Anticipated pressure differential across Work Area enclosures, and a description of methods of testing for correct air flow and pressure differentials
  4. Manufacturer's product data on the HEPA filtered fan units to be used
  5. Location of the machines in the Work Area
  6. Method of supplying adequate power to the machines and designation of building electrical panel(s) which will be supplying the power
- C. Supply the required number of HEPA filtered fan units to the site in accordance with these specifications. Use units that meet the following requirements:
  1. Cabinet: Constructed of durable materials able to withstand damage from rough handling and transportation. The width of the cabinet should be less than 30 inches to fit through standard-size doorways. Provide units whose cabinets are:
    - a. Factory-sealed to prevent asbestos-containing dust from being released during use, transport, or maintenance
    - b. Arranged to provide access to and replacement of all air filters from intake end
    - c. Mounted on casters or wheels
  2. Fans: Rate capacity of fan according to usable air-moving capacity under actual operating conditions.
  3. HEPA Filters: Provide units whose final filter is the HEPA type with the filter media

(folded into closely pleated panels) completely sealed on all edges with a structurally rigid frame.

- a. Provide units with a continuous rubber gasket located between the filter and the filter housing to form a tight seal.
  - b. Provide HEPA filters that are individually tested and certified by the manufacturer to have an efficiency of not less than 99.97 percent when challenged with 0.3 um dioctylphthalate (DOP) particles when tested in accordance with Military Standard Number 282 and Army Instruction Manual 136-300-175A. Provide filters that bear a UL 586 label to indicate ability to perform under specified conditions.
  - c. Provide filters that are marked with: the name of the manufacturer, serial number, air flow rating, efficiency and resistance, and the direction of test air flow.
4. Prefilters, which protect the final filter by removing the larger particles, are required to prolong the operating life of the HEPA filter. Two stages of prefiltration are required. Provide units with the following prefilters:
- a. First-stage prefilter: low-efficiency type (e.g., for particles 100 um and larger)
  - b. Second-stage (or intermediate) filter: medium efficiency (e.g., effective for particles down to 5 um)
5. Provide units with prefilters and intermediate filters installed either on or in the intake grid of the unit and held in place with special housings or clamps.
6. Instrumentation: Provide units equipped with:
- a. Magnehelic gauge or manometer to measure the pressure drop across filters and indicate when filters have become loaded and need to be changed
  - b. A table indicating the usable air-handling capacity for various static pressure readings on the Magnehelic gauge affixed near the gauge for reference, or the Magnehelic reading indicating at what point the filters should be changed, noting Cubic Feet per Minute (CFM) air delivery at that point
  - c. Elapsed time meter to show the total accumulated hours of operation
7. Safety and Warning Devices: Provide units with the following safety and warning devices:
- a. Electrical (or mechanical) lockout to prevent fan from operating without a HEPA filter
  - b. Automatic shutdown system to stop fan in the event of a rupture in the HEPA filter or blocked air discharge

- c. Warning lights to indicate normal operation (green), too high a pressure drop across the filters (i.e., filter overloading) (yellow), and too low of a pressure drop (i.e., rupture in HEPA filter or obstructed discharge) (red)
  - d. Audible alarm if unit shuts down due to operation of safety systems
8. Electrical components: Provide units with electrical components approved by the National Electrical Manufacturers Association (NEMA) and Underwriter's Laboratories (UL). Each unit is to be equipped with overload protection sized for the equipment. The motor, fan, fan housing, and cabinet are to be grounded.

### 2.3 PERSONNEL DECONTAMINATION ENCLOSURE SYSTEMS:

- A. A Personnel Decontamination Enclosure System is defined as a series of three connected rooms, an equipment room, shower room, and a clean room, separating the work area (enclosure) and the public area (outside of the work area--uncontaminated area); each of the connected rooms are separated by air locks. Entry and exit from all air locks and decontamination enclosure system chambers shall be through curtained doorways.
- B. Personnel Decontamination Enclosure System shall be provided as indicated for the decontamination and controlled passage of workers and other authorized personnel and shall be utilized upon commencement of all asbestos abatement work and continuing until final clearances, and shall be constructed of impact resistant materials as follows:
  1. Curtained doorways shall consist of at least three overlapping sheets of 6-mil plastic over an existing or temporarily framed doorway. One sheet shall be secured at the top and left side, the second sheet at the top and right side, and the third sheet at the top and left side. All sheets shall be weighted on the bottom at the free corner to insure that the sheets hang straight and maintain a seal over the doorway when not in use.
  2. Air lock is defined as a system for permitting passage between two spaces while minimizing air movement and/or exchange between the spaces, consisting of two curtained doorways separated by a distance of at least three feet. Each doorway has three overlapping sheets of material such that as a person passes through one curtained doorway into the air lock, the three sheets of the first doorway close before the person passes through the second doorway.
  3. Equipment rooms are defined as the contaminated area or room with provisions for the storage of contaminated clothing and equipment. It shall be situated adjacent to the work areas on one side with an air lock on the other side. The area shall be large enough to store equipment, tools, a plastic bag or sealable container for the disposal of protective clothing and shall be large enough for one or two workers to remove protective clothing.
  4. An air lock shall separate all equipment rooms and shower rooms.
  5. Shower rooms shall be constructed in such a way as to eliminate the possibility of leakage of any kind. There shall be a least one shower head supplied with hot and cold water controlled at the tap. Soap, shampoos, and towels shall be provided by the

Contractor. Waste water shall be filtered through a system capable of collecting particulate of 5.0 micron, and should be capable of handling the water generated by the shower head(s) for an indefinite length of time. A system containing a series of several filters with progressively smaller pore sizes shall be used to avoid rapid clogging of the filtration system by large particles. Filtered waste water shall be discharged to a sanitary sewer. The Contractor shall demonstrate the operation of the filtration system to the Asbestos Project Manager. Arrange water shut-off and drain pump operation controls so that a single individual can shower without assistance from either inside or outside of a work area. Thoroughly clean and disinfect the shower at the end of each shift.

6. An air lock shall separate all shower rooms and clean rooms.
7. Clean rooms shall be physically and visually separated from the rest of the building. The clean room shall be maintained uncontaminated and provide space and provisions for personnel to change and store street clothes, protective clothing, equipment (respirators and uncontaminated tools), and personal valuables. A location designated for posting information herein required shall be provided and utilized. Benches shall be provided as well as hooks for hanging up street clothes. Shelves and racks for storing respirators and supplies shall also be supplied.
  - a. Require workers to remove all street clothes in this room, dress in clean disposable overalls, and don respiratory protection equipment. Do not allow asbestos contaminated items to enter this room. Require workers to enter this room either from outside the structure dressed in street clothes, or naked from the shower.
  - b. Maintain floor of clean room dry and clean at all times. Do not allow overflow water from shower to wet floor in changing room.
8. Provide a continuously adequate supply of disposable bath towels.

#### 2.4 EQUIPMENT DECONTAMINATION ENCLOSURE SYSTEMS:

- A. Provide equipment decontamination units consisting of a serial arrangement of rooms: holding room and wash room for removal of equipment and material from the work area. Do not allow personnel to enter or exit work areas through equipment decontamination units.
  1. Wash Rooms: Provide a wash room for the cleaning of bagged or containered asbestos-containing waste materials passed from the work area. Construct wash rooms of 2" X 4" wood framing and polyethylene sheeting, at least 6-mil in thickness and located so that packaged materials, after being wiped clean can be passed to the holding room. Separate these rooms from the work area by a double flap of 6-mil polyethylene sheeting.
  2. Wash Down Stations: Provide leak tight shower enclosures with integrated drain pan fabricated from fiberglass or other durable waterproof material, approximately 3' x 3' square with minimum 6' high sides and back. Structurally support as necessary for stability. Equip with hose bib, mounted at approximately 4'-0" above drain pan. Connect drain to a reservoir, pump water from reservoir through filters to a drain or store and use for amended water. Mount filters inside shower stall on back wall beneath hose bib.



3. Holding Rooms: Provide holding rooms as a drop location for bagged asbestos-containing materials passed from the wash room. Construct holding rooms of 2" X 4" wood framing and polyethylene sheeting, at least 6-mil in thickness. Separate these rooms from the adjacent rooms by a curtained doorway, and from the exterior by a lockable door.
  4. Contractor shall HEPA vacuum or wet clean the decontamination enclosures daily at completion of abatement activities.
- B. All prefabricated decontamination enclosure systems or mobile units must be approved for use by the Asbestos Project Manager.

## 2.5 CAUTION SIGNS AND LABELS:

- A. "Danger - Asbestos Hazard" signs in accordance with OSHA regulation 29 CFR 1910.1001 shall be posted at all internal and external doorways that lead to the area in which the work will take place.
- B. Post the following in the clean room of the personnel decontamination enclosure system:
  1. A copy of the Illinois Department of Public Health Rules and Regulations.
  2. A copy of the U.S. Environmental Protection Agency Regulations for Asbestos, 40 CFR 61 Subparts A and M and a copy of U.S. Department of Labor - OSHA Asbestos Regulations, 29 CFR 1926.1101.
  3. A list of telephone numbers for emergency assistance and any representatives authoritatively involved with the project who shall be notified in case of emergency.
  4. A sign-in/sign-out log book.
  5. A copy of these specifications.
- C. Disposal Container Label: All containers which will be used for disposal of asbestos-containing materials and other contaminated materials shall be labeled according to OSHA Regulation 29 CFR 1910.1001 (g), and as required under 40 CFR Part 61.

## 2.6 MATERIALS:

- A. Plastic Film: 6-mil polyethylene sheets shall be used for all enclosures and as herein specified. 4-mil polyethylene sheets may be used for wall construction in accordance with IDPH regulations.
- B. Spray Film: No vinyl chlorides permitted.
- C. Disposal Bags: 6-mil (minimum thickness) polyethylene of sufficient size for application, labeled as herein specified.

- D. Tape: Duct tape.
- E. Spray Adhesives: Shall contain no noxious propellants, or other hazardous ingredients.
- F. Wetting Agent (Surfactant): When added to water, the surfactant solution is referred to as Amended Water. The surfactant used will be one that is non-toxic, noncarcinogenic, and is not a eye, nose or skin irritant.
- G. Lock- Down Encapsulants: Liquid polymer. Certane 1000 or equal.
- H. Penetrating Encapsulants: Penetrating encapsulants rated "Acceptable" when tested under the procedures of: "Batelle Columbus Laboratories' Tests for the Evaluation of Encapsulants for Friable Asbestos-Containing Materials." An updated list is maintained by the EPA. Use only materials that have a flame spread index of less than 25, when dry, when tested in accordance with ASTM E-84.
- I. Bridging Encapsulants: Bridging encapsulants rated "Acceptable" when tested under the procedures of: "Batelle Columbus Laboratories' Tests for the Evaluation of Encapsulants for Friable Asbestos-Containing Materials." An updated list is maintained by the EPA. Use only materials that have a flame spread index of less than 25, when dry, when tested in accordance with ASTM E-84.
- J. Solvents for mastic removal: Sentinel 7200, Certane 77B, or equal. No citrus-based solvents shall be accepted for use.

### PART 3 - EXECUTION

#### 3.1 GENERAL:

- A. Do not commence asbestos abatement work until: arrangements have been made for disposal of waste at an acceptable site; arrangements have been made for containment filtration and disposal of waste water resulting from wet stripping; tools, equipment and material waste receptors are on hand; and all other preparatory steps have been taken and applicable notices posted and permits obtained.
- B. Contractor shall conduct a safety drill prior to commencement of work, and as personnel changes occur. Drill shall consist of a mock emergency such as fire, or personal injury. Contractor's designated safety person shall lead others in a manner to clearly explain safety procedures.
- C. Maintain the building's fire alarm system operation whenever feasible. Where execution of Work requires systems to be shut down, safety procedures shall include alternate systems to immediately notify all personnel of an emergency.
- D. Postings and Notices: Contractor shall post signs meeting the specifications of OSHA 29 CFR 1926.1101 and IDPH Rules and Regulations at all internal doorways which provide access to the Work Areas, and at every approach to the Work Areas in advance of the work barriers, thus

allowing a person to avoid Work Areas or, if necessary, take the proper precautionary measures prior to entry into a Work Area.

1. Signs posted at every approach to the Work Areas shall bear the following information: DANGER ASBESTOS CANCER AND LUNG DISEASE HAZARD AUTHORIZED PERSONNEL ONLY.
  2. In addition, where the use of respirators and protective clothing is required in the regulated area, the warning signs shall include the following: RESPIRATORS AND PROTECTIVE CLOTHING ARE REQUIRED IN THIS AREA.
- E. To ensure security of a Work Area, provide one or more of the following methods to ensure access to a Work Area only by Contractor personnel or Asbestos Project Manager [77 Administrative Code 855.430 b)]. Maintain emergency means of egress at all times. At project closeout, return such modifications to original condition.
1. Secure all doors which will be used by authorized personnel to access the Work Area. Recylinder existing locks, install hasps and padlocks or chains and padlocks on doors. Issue keys to only necessary Contractor personnel and Asbestos Project Manager.
  2. Secure all doors which will be unnecessary for entrance during progress of Work. Plug existing locks, install hasps and padlocks or chains and padlocks, or wedge doors securely with nails and 2"x 4" lumber.
  3. Construct separation barriers between Work Areas and Owner occupied areas, composed of ½ inch minimum thickness plywood, gypsum board, or similar sheathing with sufficient framing to support barrier. Barrier shall extend from the floor level to within six inches of the ceiling, but is not required to exceed 8' in height. Install plywood doors, minimum ½ inch thick, with hinges, hasps and padlocks, at locations where Contractor personnel enter and exit the work area.
- F. Perform asbestos related work in accordance with procedures herein specified. Personnel shall wear and utilize protective clothing and equipment as specified. Do not permit eating, smoking, drinking, chewing gum, applying cosmetics, or sleeping in asbestos control areas and work areas. Do not expose personnel of other trades, not engaged in asbestos related work, at any time to airborne asbestos fibers.

### 3.2 PRE-ABATEMENT:

- A. Owner will remove all furniture and movable equipment prior to turning the area over to the Contractor.
- B. Isolate the building heating, ventilating, and air conditioning (HVAC) system as required to prevent the possibility of spreading contaminated air to other parts of the buildings.
- C. Disconnect, lockout and tag electrical service in Work Areas and provide temporary electrical service as described in IDPH regulations.

- D. Pre-cleaning: In areas which require enclosure the Contractor shall pre-clean all permanent fixtures within the proposed Work Areas using HEPA vacuum equipment and/or wet cleaning methods. Permanent fixtures will be enclosed in 6-mil plastic sheeting and sealed with tape. Movable objects will have been removed from the Work Areas to storage areas outside the area of work by the Owner's personnel, unless otherwise noted on the Drawings.
1. Vacuum the entire area using a HEPA vacuum system.
  2. Wet clean the entire area using mops, cloths, and other cleaning tools which will be disposed of as asbestos waste.
- E. Following the pre-cleaning, the Asbestos Project Manager will inspect the proposed work areas for visible signs of dust or debris. If acceptable, the Contractor may then commence work area isolation. If the pre-cleaning is deemed unacceptable, the Contractor shall reclean the proposed work areas and the process will be repeated.

### 3.3 ENCLOSURES AND SET-UP:

#### A. Enclosure Set-up:

1. The Contractor shall erect separation barriers to enclose the work area in accordance with 77 Administrative Code 855.430 a). The work side of the barriers shall be prepared before any other project activities are begun.
  - a. Where barrier will separate the work area from an occupied area, it shall be constructed of 2" x 4" studs at 24" on center and ½" plywood or drywall on containment side, and a minimum of 8 feet high. Gypsum board and similar cementitious material shall be protected on the work side from damage from moisture, such as by painting or by covering with polyethylene sheeting. All seams and edges of the barriers shall be caulked, or the work side of the barrier shall be covered with 2 layers of six mil polyethylene or equivalent sheeting with overlapping seams and taped seams and edges.
  - b. If the space on the outside of the barrier is not occupied and is secured so that there is no access by building occupants, including custodial and maintenance employees, the barrier may be constructed of lumber or metal framing with a maximum on-center spacing of 24 inches, with two layers of polyethylene sheeting with staggered joints applied to each side of the framing. Edges and seams must be taped.
2. The contractor shall seal off all penetrations of all enclosure areas, and complete all Primary Seals (including but not limited to ducts, diffusers, vents, lights, seams in system components, windows, doors, locker door louvers, gaps above ceilings and any other penetrations of the Work Area) using 6-mil polyethylene and tape.
3. Cover the floor and wall surfaces in contained areas with plastic sheeting sealed with tape. Use a minimum of two layers of six mil plastic or equivalent on floors (no plastic on the floor shall be required when the project includes removal of floor tile and associated mastic) and two layers of four mil plastic or equivalent on walls. Cover floors first so that

plastic extends at least 12 inches up on walls, then cover walls with plastic sheeting to the floor level, thus overlapping the floor material by a minimum of 12 inches. The plastic shall be sized to minimize seams. Seams shall be staggered and separated by a distance of at least six feet. In hallways where asbestos materials are adjacent to lockers, sheeting shall extend to the top of the lockers.

4. After the first layer of polyethylene has been attached, the Contractor shall notify the Owner's Representative who will inspect the polyethylene for tears, delamination, holes, etc.
  5. Following inspection and acceptance of the first layer, the Contractor shall apply a second layer of polyethylene in the same manner described above.
    - a. Wall and ceiling sheeting shall be secured so as to prevent it from detaching from the floors and walls for the duration of the project.
  6. Install one layer of 6 mil polyethylene sheeting on ceiling in areas where ceiling is constructed of suspended, glued-on or spline panels. An equivalent method, such as the construction of a tunnel with a 6 mil polyethylene ceiling, is acceptable. It is not required to prep smooth plaster, concrete or drywall ceilings. Do not prep ceiling in areas where the ceiling itself is part of the work.
- B. Tented Enclosures for Glovebag Removal Work:
1. Glovebag removal of pipe insulation shall be performed within small "tented" negative pressure mini-containments where indicated by the Contract Documents.
  2. The mini-containment shall be large enough for 2 persons to work uninhibited during all Work performed within the enclosure, and shall be constructed of 6-mil polyethylene sheeting extending from the ceiling to the floor on existing walls or on freestanding partitions reinforced with rigid framing material such that the enclosure is stable and completely isolated.
  3. Where working on pipe insulation above the ceiling, apply one layer of plastic sheeting to underside of ceiling in containment and extend plastic sheeting up to include ACM in containment.
  4. Where working on pipe insulation inside a pipe chase or wall that cannot be accessed using an existing access panel or door, contractor shall demolish wall as needed after obtaining permission from the Construction Manager.
  5. The mini-containment shall be entered through an airlock consisting of two curtained doorways separated by a distance of at least three feet or an attached decontamination unit.
  6. The floors shall be covered with two layers of 6-mil polyethylene sheeting secured with tape and sized so as to minimize seams.

7. Negative pressure ventilation by use of HEPA-filtered negative air units shall be utilized for mini-containments. Exhaust shall be ducted to the exterior of the building. The system shall provide a minimum of one air change in the Work Area every 15 minutes. Seal airtight all points of penetration through the enclosure by the negative air system with tape or caulking.
    - a. Wire-reinforced flexible tubing may be used to draw contaminated air from one mini-containment to another.
    - b. Negative air units shall be located in such a way that all filter changes are made inside a tent enclosure.
    - c. The use of HEPA-filtered vacuum cleaners for negative pressure is not permitted.
  8. The mini-containment shall remain intact and under negative pressure until air samples have been analyzed and results submitted to, the Asbestos Project Manager and the Asbestos Project Manager approves demolition of the mini-containment. The clearance criteria shall be as set forth in "Clearance Air Monitoring."
  9. Mini-containments shall not be used for any type of asbestos removal other than the glovebag removal method.
- C. Non-Friable Removal Work Areas:
1. Removal of floor tile, mastic and other non-friable materials shall be performed within regulated areas where indicated by the Contract Documents. Prior to beginning abatement, the Contractor shall install the following engineering controls in order to prevent contamination spreading from the immediate work area if the Contractor causes non-friable materials to become friable.
  2. The contractor shall seal off all penetrations of all enclosure areas, and complete all Primary Seals (including but not limited to ducts, diffusers, vents, lights, seams in system components, windows, doors, locker door louvers, gaps above ceilings and any other penetrations of the Work Area) using 6-mil polyethylene and tape.
  3. The work area shall be entered through an airlock consisting of two curtained doorways separated by a distance of at least three feet.
  4. HEPA-filtered negative air units shall be placed in the work area. Exhaust shall be ducted to the exterior of the building.
  5. Contractor may enclose smaller areas with free-standing 6-mil polyethylene barriers to which an airlock and negative air machine are attached.
- D. Maintain emergency and fire exits from the Work Area and other portions of the building, or establish alternative exits according to local laws and building codes. Clearly indicate exits throughout the Work Area and enclosure.

3.4 NEGATIVE PRESSURE VENTILATION SYSTEMS:

- A. Negative pressure ventilation systems shall be utilized for the enclosure, from the commencement of pre-removal activities through the final clearance of the work areas. The system shall provide a minimum of one air change in a work area every 15 minutes with the exhaust air routed outside of the building. Seal airtight all points of penetration through the workplace barrier by the negative air system with tape or caulking.
- B. Air circulation in the Work Area is a minimum requirement intended to help maintain airborne fiber counts at a level that does not significantly challenge a work area isolation measures. The Contractor may also use this air circulation as part of the engineering controls in his worker protection program. Provide a fully operational air circulation system supplying a minimum of 4 air changes per hour

1. Determine Number of Units needed to achieve required air circulation according to the following procedure:

Air Circulation Required in Cubic Feet of Air per Minute (CFM)=

Volume of work area (cu. ft.) x (Number of air changes per hour/60 minutes per hour)

Number of Units Needed = 
$$\frac{\text{Air circulation Requirement (CFM)}}{\text{Capacity of Unit with Loaded Filters (CFM)}}$$

2. Add one (1) additional unit as a backup in case of equipment failure or machine shutdown for filter changing.
3. Exhaust all units from a Work Area to meet air circulation requirement of this Section.
4. Location of HEPA Filtered Fan Units: Locate fan unit(s) so that makeup air enters a work area primarily through decontamination facilities and traverses the Work Area as much as possible. This may be accomplished by positioning the HEPA filtered fan unit(s) at a maximum distance from the worker access opening or other makeup air sources.
- C. Power: Each unit shall be serviced by a minimum 115V-20A circuit with ground fault circuit interrupter (GFCI).
- D. Isolate the Work Areas from all adjacent areas or systems of the building with a Pressure Differential that will cause a movement of air from outside to inside at any breach in the physical isolation of the Work Area.
1. Relative Pressure in Work Area: Continuously maintain the Work Area at an air pressure that is lower than that in any surrounding space in the building, or at any location in the immediate proximity outside of the building envelope. This pressure differential when measured across any physical or critical barrier must equal or exceed a static pressure of -0.02 inches of water.

2. Accomplish the pressure differential by exhausting a sufficient number of HEPA filtered fan units from the Work Areas. The number of units required will depend on machine characteristics, the seal at barriers, and required air circulation. The number of units will increase with increased make-up air or leaks into a Work Area.
  3. Vent HEPA filtered fan units to outside of building. Mount units to exhaust directly or through disposable ductwork. Use only new ductwork except for sheet metal connections and elbows. Use ductwork and fittings of same diameter or larger than discharge connection on fan unit. Use inflatable, disposable plastic ductwork in lengths not greater than 100 feet. Use spiral wire-reinforced flex duct in lengths not greater than 50 feet. Arrange exhaust as required to inflate duct to a rigidity sufficient to prevent flapping. If direction of discharge from fan unit is not aligned with duct use sheet metal elbow to change direction. Use six feet of spiral wire reinforced flex duct after direction change.
- E. Testing the System: Test pressure differential system before any asbestos-containing material is wetted or removed. After the Work Areas have been prepared, the decontamination facilities set up, and the fan unit(s) installed, start the unit(s) (one at a time). Demonstrate operation and testing of pressure differential system to Asbestos Project Manager.
1. Demonstrate Condition of Equipment for each HEPA filtered fan unit and pressure differential monitoring equipment including proper operation of the following:
    - a. Squareness of HEPA Filter
    - b. Condition of Seals
    - c. Proper operation of all lights
    - d. Proper operation of automatic shut down if exhaust is blocked
    - e. Proper operation of alarms
    - f. Proper operation of Magnehelic gauge
    - g. Proper operation and calibration on pressure monitoring equipment
  2. Demonstrate Operation of the pressure differential system to the Asbestos Project Manager will include, but not be limited to, the following:
    - a. Strip chart with manometer records a constant reading of -0.02 inches of water.
    - b. Plastic barriers and sheeting move lightly in toward Work Area,
    - c. Curtain of decontamination units move lightly in toward Work Area,
    - d. There is a noticeable movement of air through the Decontamination Unit.
  3. Use smoke tube to demonstrate air movement from Clean Room through Shower Room to Equipment Room.
  4. Use smoke tubes to demonstrate a definite motion of air across all areas in which work is to be performed.
- F. Start fan units before beginning work (before any asbestos-containing material is disturbed). After abatement work has begun, run units continuously to maintain a constant pressure differential and air circulation until decontamination of the work area is complete. Do not turn off units at the end of the work shift or when abatement operations temporarily stop.



1. Do not shut down air pressure differential system during encapsulating procedures. Supply sufficient pre-filters to allow frequent changes.
  2. Start abatement work at a location farthest from the fan units and proceed toward them. If an electric power failure occurs, immediately stop all abatement work and do not resume until power is restored and fan units are operating again.
- G. When a final inspection and the results of final air tests indicate that the area has been decontaminated, fan units may be removed from the Work Area. Before removal from the Work Area, remove and properly dispose of pre-filter, decontaminate exterior of machine and seal intake to the machine with 6 mil polyethylene to prevent environmental contamination from the filters.
- H. After construction of the polyethylene barriers, the APM will visually inspect the decontamination enclosure systems and work area barriers, and with the negative air system operating, will test the overall effectiveness of the system using smoke tubes.

### 3.5 WORK PROCEDURES:

- A. Personnel entries and exits: Where decontamination enclosure systems are herein required, the following procedures shall be followed throughout the abatement project until clearance air monitoring has been performed and documented to the satisfaction of the Asbestos Project Manager. Post these procedures in the clean rooms and equipment rooms and assure compliance therewith.
1. All persons shall enter a Work Area through the personnel decontamination enclosure system and shall sign the entry log, located in the clean room, upon entry and exit.
  2. All persons, before entering a Work Area, shall read and be familiar with all posted regulations, personal protection requirements (including workplace entry and exit procedures) and emergency procedures. A sign-off sheet shall be used to acknowledge that these have been reviewed and understood by all persons prior to entry.
  3. All persons shall proceed first to a Work Area clean room, remove all clothing and don respiratory protection, disposable coveralls, head covering and foot covering. Clean respirators and protective clothing shall be provided and utilized by each person for each separate entry into a Work Area.
  4. Persons wearing designated personal protective equipment shall proceed from a Work Area clean room through the shower room and equipment room to the main Work Area.
  5. Before leaving a Work Area, all persons shall remove gross contamination from the outside of respirators and protective clothing by brushing and/or vacuuming procedures.
  6. Personnel shall proceed to the equipment room, where protective equipment except respirators shall be removed. Disposable clothing shall be deposited into labeled containers for disposal.

7. Reusable, contaminated footwear shall be stored in the equipment room when not in use in a Work Area and shall be disposed of as asbestos-contaminated waste upon completion of abatement. (Rubber boots may be decontaminated at the completion of the abatement for reuse.)
  8. Still wearing respirators, personnel shall proceed to the shower area, clean the outside of the respirator and the exposed face area under running water prior to removal of the respirator, and then shower and shampoo to remove residual asbestos contamination. A powered air-purifying respiratory face piece will be disconnected from the filter/power pack assembly, which is not waterproof, upon entering the shower.
  9. After showering and drying, personnel shall proceed to the clean room and don clean disposable clothing if returning to the Work Area or street clothes at the end of the work shift.
- B. Remote decontamination unit procedures:
1. All workers performing glovebag work in areas which are isolated from the main Work Area shall use remote decontamination unit procedures as described herein. The entire route traversed by the worker in going from the Work Area to the decontamination unit must be isolated from the rest of the building with locked doors and/or separation barriers as described in 77 Administrative Code 855.430 b).
  2. Prior to entering a Work Area, all personnel shall don the specified respirator and two layers of disposable protective coveralls.
  3. At each mini-containment, personnel shall enter an **airlock** separating the Work Area from the rest of the building.
  4. Upon exiting the Work Area, each worker shall remove the outer layer of protective clothing and cover any contaminated footwear with a clean pair of disposable booties. Still wearing the respirator and the inner coverall, the worker may leave the airlock or regulated area and proceed directly to the decontamination unit or enter the airlock of another Work Area where the procedure will be repeated.
- C. Gross Removal Procedures General: Removal is defined as the stripping of any asbestos-containing materials from surfaces or components of a facility or taking out structural components in accordance with 40 CFR 61 Subparts A and M.
1. Prior to any removal activity, sufficiently wet the asbestos-containing material with an amended water solution using a fine mist sprayer allowing thorough saturation of the material while avoiding excessive accumulation of water on the floor.
  2. Following the initial spraying of the material, at least 30 minutes shall elapse to allow maximum penetration of the material.
  3. Continuous spraying of the Work Area to reduce airborne fiber concentrations will be

maintained for the duration of the removal activities.

4. When possible, place the material removed directly into 6-mil plastic bags and seal immediately. If the material cannot be placed directly into bags then it should be handled in such a manner as to reduce the dispersion of asbestos fibers. The material should not be dropped to the floor.
5. When possible, remove material intact and unbroken to minimize the possibilities of fiber release.
6. Once the asbestos material has been removed from the substrate, wash the surface of the substrate with a fiber brush or sponge etc., to remove any visible residual asbestos material.
7. Throughout the removal process, all asbestos material shall be kept wet to avoid the dispersion of fibers into the work environment.
8. All tears or detachments of the polyethylene shall be repaired immediately and reported to the Asbestos Project Manager.
9. Remove all accumulations of water from the floor using HEPA vacuums and/or squeegees.
10. All waste materials shall be double-bagged and sealed with duct tape or placed in sealed drums and shall be removed from the Work Area through the equipment/waste decontamination enclosure.
11. Asbestos-containing waste materials with sharp-edged components (e.g., nails, screws, metal lath, tin sheeting, floor tile, and metal ceiling components) which may tear the polyethylene bags or sheeting shall be placed into drums for disposal. In lieu of disposal drums, floor tile may be wrapped in one layer of burlap and two six mil labeled polyethylene or equivalent bags.
12. All tools and equipment shall be removed from the Work Area and decontaminated in the equipment/waste decontamination enclosure system.

#### D. GLOVEBAG PROCEDURES

1. Removal by glovebag is defined as a method for removing asbestos containing material from heating, ventilation, and air conditioning (HVAC) ducts, piping runs, valves, joints, elbows, and other nonplanar surfaces in a Work Area not totally contained. The glovebag is installed in such a manner that it surrounds the object or area to be decontaminated and contains all asbestos fibers released during the removal process.
2. Glovebag removal shall be performed within a mini-containment. Areas where removal by tented glovebag technique is indicated shall be isolated prior to removal with negative pressure enclosures constructed as specified above.
3. All removal by glovebag shall be performed by a team of two workers. All persons

performing removal by glovebag shall wear, at a minimum, Powered Air Purifying Respirators (PAPR) equipped with HEPA filters. In addition, two layers of protective clothing shall be worn if work is to be performed using a remote decontamination facility.

4. Contractor shall perform removal by glovebag in accordance with all EPA, OSHA, State, and local guidelines.
  5. Glovebags shall be made of 6 mil poly and shall be seamless on the bottom. Glovebags shall be installed so that they completely cover the circumference of the pipe and shall be smoke tested prior to use.
  6. Glovebags may only be used once and they may not be moved.
  7. Following removal of asbestos containing material, workers shall place used glovebag and outer disposable suit into a 6 mil disposal bag before exiting mini-containment where removal occurred. This bag shall be treated as asbestos containing waste and disposed of as such.
  8. All personnel performing, or assisting in the performance of, removal shall proceed directly to shower upon their exit from the mini-containment or regulated area in which work occurred. The only exception to this will be cases in which the removal personnel are proceeding directly to a subsequent mini-containment or regulated area.
  9. Emergency Procedures: If at any time before completion of removal, the glovebag becomes detached from the substrate or the barrier is broken, the following steps shall be taken immediately:
    - a. The damaged or detached bag shall be repaired.
    - b. The entire area shall be wet cleaned.
    - c. Workers shall remove outer disposable suit and proceed directly to the shower.
    - d. Asbestos Project Manager or Air Sampling Professional shall be notified so that an air sample may be taken to determine the extent of fiber release.
- E. NON-FRIABLE FLOOR TILE AND MASTIC REMOVAL PROCEDURES:
1. Place primary seals on all openings to the work area. Place 'Danger: Asbestos' signs on seals at all entries to the work area.
  2. Establish negative pressure within the work area using a negative air machine or a HEPA vacuum.
  3. Use heat to soften tile and mastic.
  4. Lift tiles without causing additional breakage and place in disposal bags. The use of

small hand tools is permitted. No mechanical or pneumatic chipping device, long-handled scraper, or spud bar shall be used.

5. Wet clean the surface following floor tile removal.
6. Remove mastic using solvents and hand-held towels or abrasive pads. The use of any mechanical or pneumatic scrubbing device is prohibited.
7. Thoroughly clean the area using HEPA vacuums and/or wet methods.
8. Thoroughly wet mop concrete subfloor until mop water is clear.
9. Contractor's employees shall use remote decontamination procedures.

F. ASBESTOS OPERATIONS AND MAINTENANCE WORK (O&M):

1. Erect separation barriers described in 855.430 b). Post danger asbestos signs. All personnel that are to enter the work area shall don disposable suits and respirators.
2. Pre-clean work area prior to conducting O&M activities. Place a dropcloth of six mil clear polyethylene sheeting below the work area. Mobilize necessary tools, equipment, and materials.
3. Where scope of work requires repair of ACM insulation, adequately wet area of insulation to be repaired with amended water. Adjacent friable materials that may potentially become disturbed during patch and repair activities shall be wrapped in one layer of six mil clear polyethylene. Loose debris and material shall be HEPA vacuumed, leaving surface clean.
4. Fill in repair area with non-ACM patching material. Re-wettable cloth shall be dipped in water and applied to the area of insulation being repaired, or palm-grade encapsulant and fiberglass mesh fabric, or equivalent materials, shall be applied.
5. Where building components that have ACM on them are to be demolished, demolish them without disturbing ACM.
6. Where the scope of work requires drilling or cutting through ACM, equipment shall have a vacuum attachment at the point of cut, and a HEPA vacuum shall be connected and operating. Adequately wet ACM prior to and during work.
7. Clean tools, equipment and the drop cloth using wet wiping and HEPA vacuuming as appropriate.
8. Remove tools and equipment from the work area and place the dropcloth in asbestos disposal bags.
9. Workers shall decontaminate clothing and shall remove the outer suit prior to de-regulating the work area. Contaminated clothing shall be placed into asbestos disposal

bags.

10. Transport waste to designated asbestos waste storage area.
11. Remove barriers and signs, and restore accessibility to the work area.

### 3.6 CLEANING:

- A. Housekeeping: Maintain surfaces of enclosure area free of accumulations of asbestos fibers. Restrict spread of dust and debris; keep waste from being distributed over general area. Do not blow down space with fans or compressed air. HEPA vacuum or wet clean the decontamination enclosures at the completion of daily abatement activities.
- B. Wet Cleaning is defined as the process of eliminating asbestos contamination from building surfaces and objects by using cloths, mops, or other cleaning tools which have been dampened with water, and by afterward disposing of these cleaning tools as asbestos-contaminated waste.
- C. Clean-up: Once all waste material has been removed from a gross removal Work Area, and the substrate has been washed, clean-up should proceed as follows:
  1. Wet clean the entire area using cloths, mops, and airless spraying equipment. To pick up excess water and gross wet debris, a wet-dry shop vacuum or HEPA vacuum may be used. If a vacuum is used, it shall be decontaminated prior to removal from the contained area. (See IDPH 855.465).
  2. Allow the area to settle undisturbed for a period of no less than 12 hours.
  3. If all surfaces are dry, remove the cleaned first layer of plastic sheeting from walls and floors, fold inward and place in bags for disposal as asbestos waste.
  5. Second cleaning: Wet clean and/or HEPA vacuum the second layer of plastic sheeting and the entire area as described above for a second time.
  6. Allow the area to settle undisturbed for a period of no less than 12 hours.
  7. If all surfaces are dry, remove the cleaned second layer of plastic sheeting from walls and floors, fold inward and place in bags for disposal as asbestos waste. Primary seals shall remain in place.
  8. Third cleaning: Wet clean and/or HEPA vacuum the entire area as described above for a third time.
  9. Notify the Asbestos Project Manager upon completion of the third cleaning. The Asbestos Project Manager will inspect the work area to confirm that the clean-up has been completed satisfactorily. If the area is not ready for release, the area shall be recleaned and allowed to settle for a period of 6 hours and cleaning and inspection will be repeated. If approved, proceed as follows.

10. Encapsulate (Lockdown) as described below. Contractor may omit encapsulation at his discretion.
  11. Allow the area to settle undisturbed for a period of no less than 12 hours. This settling period is required whether encapsulation is performed or not.
- D. Clean-up of glovebag removal areas: Once all waste material has been removed from a glovebag removal Work Area, and the substrate has been washed, clean-up should proceed as follows:
1. HEPA vacuum the entire Work Area to remove any visible signs of dust, debris, or residue of any kind. (See IDPH 855.465).
  2. Wet clean the entire area using cloths, mops, and airless spraying equipment.
  3. Allow the area to settle undisturbed for a period of no less than 12 hours.
  4. Second cleaning: If all surfaces are dry, wet clean and/or HEPA vacuum the entire area as described above for a second time.
  5. Notify the Asbestos Project Manager upon completion of the second cleaning. The Asbestos Project Manager will inspect the work area to confirm that the clean-up has been completed satisfactorily. If the area is not ready for release, the area shall be recleaned and allowed to settle for a period of 6 hours and cleaning and inspection will be repeated. If approved, proceed as follows.
  6. Encapsulate (Lockdown) as described below. Contractor may omit encapsulation at his discretion.
  7. Allow the area to settle undisturbed for a period of no less than 12 hours. This settling period is required whether encapsulation is performed or not.
- E. Encapsulation: Do not commence application of encapsulating materials until all removal work within the Work Area has been completed.
1. Any unfinished substrate from which ACM has been removed may be encapsulated using an approved lockdown encapsulant. The encapsulant shall be applied using low pressure or airless spray equipment.
    - a. Appropriate respiratory equipment shall be worn during encapsulation of a Work Area.
    - b. The surface to which the encapsulant is applied shall be thoroughly dry and free of moisture.
    - c. Finished surfaces shall not be encapsulated.
    - d. The contractor may elect to encapsulate concrete, pipes, conduit, and other

unfinished surfaces.

### 3.7 DISPOSAL PROCEDURES:

- A. Removal and disposal of asbestos containing waste shall be handled in accordance with OSHA 29 CFR Parts 1910 and 1926, local laws, codes and regulations, and as follows:
1. Sealed and labeled containers of asbestos containing waste shall be removed and transported to a prearranged disposal location.
  2. All dump receipts, trip tickets, transportation manifests and/or other documentation of disposal shall be delivered to Asbestos Project Manager.
    - a. Names and addresses of the Owner, Contractor, pickup site, disposal site, number of containers, and volume or weight of material.
    - b. This form shall be signed by the Owner, the Contractor, and the disposal site operator as the material changes custody.
    - c. The form shall include name, address, and telephone number of any separate haulers employed.
- B. The Contractor shall transport asbestos materials in accordance with the following procedures:
1. The cargo area of the transportation vehicle shall be enclosed, lockable, and have one layer of polyethylene covering the floor and walls in such a manner to trap any material which may be released from sealed waste containers.
  2. Load drums, bags and wrapped components that have been removed from the work area into cargo area such as to minimize potential for leakage.
  3. Large metal dumpsters used for asbestos waste disposal shall have doors or tops that can be closed and locked to prevent vandalism, wind dispersion of asbestos fibers, or other disturbance of bagged asbestos debris. Line the dumpster with polyethylene as described above.
  4. Unbagged asbestos material and nonasbestos waste shall not be placed in these containers. Bags shall be placed, not thrown, into these containers to avoid splitting.
  5. Personnel loading asbestos containing waste shall be protected by disposable clothing (including head, body and foot protection) and, at a minimum, half-facepiece, air-purifying, dual cartridge respirators equipped with HEPA filters.
  6. Any debris or residue observed on surfaces of containers located in uncontaminated areas shall be immediately cleaned up using HEPA filtered vacuum equipment and/or wet methods.
  7. Asbestos containing materials shall be transported directly to the landfill. Temporary



storage at a location other than the project site as indicated shall not be permitted.

- C. The Contractor shall dispose of asbestos materials in accordance with the following procedures:
  - 1. Upon reaching the landfill, the vehicle shall approach the dump location as close as possible for unloading of the asbestos containing waste.
  - 2. Bags, drums, and components shall be inspected when off-loaded at the disposal site. Material in damaged containers shall be repacked in empty drums or bags.
  - 3. Waste containers shall be placed on the ground at the disposal site, not pushed or thrown (the impact of wet material could rupture containers).
  - 4. Personnel off-loading containers at the disposal site shall be protected by disposable clothing (including head, body and foot protection) and, at a minimum, half-facepiece, air-purifying, dual cartridge respirators equipped with HEPA filters.
- D. Following the removal of all containerized waste, the cargo area shall be decontaminated using HEPA vacuums and/or wet methods. Polyethylene shall be removed and discarded in bags or drums along with contaminated cleaning materials and protective clothing.

### 3.8 REESTABLISHMENT OF THE WORK AREAS:

- A. Following satisfactory clearance air monitoring, Asbestos Project Manager will visually inspect the Work Areas.
- B. Reestablishment of a Work Area will occur only following the completion of the cleanup procedures and after clearance air monitoring and non-compliances have been properly performed and documented to the satisfaction of the Asbestos Project Manager.
  - 1. If additional cleanup is necessary, such additional cleaning and air monitoring costs shall be incurred by the Contractor.
- C. Following completion of clearance air monitoring and work area inspection, the primary seals, remaining polyethylene barriers, and decontamination enclosure systems shall be removed and disposed of as asbestos contaminated waste. Following removal of these barriers, the entire area shall be HEPA vacuumed to remove residual fibers.
- D. Objects removed from former positions during area preparation activities shall be re-secured.
- E. Objects moved to temporary locations may be relocated to original positions.
- F. Reestablish mechanical, and electrical systems to acceptable working order.

END OF SECTION 020800.