

BATTA ENVIRONMENTAL ASSOCIATES, INC.

SECTION 02061 - BUILDING COMPONENT DEMOLITION-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.

1.2 DESCRIPTION OF THE WORK

- A. The work of this Section** includes the demolition of buildings and installations where asbestos containing materials are present.

1.3 RELATED WORK SPECIFIED ELSEWHERE:

- A. Work to be completed prior to start of the work of this section** are set forth in the following sections:
 - 1.** 01560 Worker Protection - Asbestos abatement
 - 2.** 01562 Respiratory Protection
 - 3.** 01563 Decontamination Units
- B. Section 02084 Disposal of Regulated Asbestos-Containing Material** describes the handling and disposal of asbestos-containing waste.
- C. Section 02086 Hazardous Waste Management** describes the management and disposal of hazardous waste such as PCB Ballasts, fluorescent light tubes, and mercury containing thermostats encountered during the work of this section.

1.4 SUBMITTALS:

- A. Before Start of Work:** Submit the following to the Owner's Representative for review. Do not start work until these submittals are returned with Owner's Representative action stamp indicating that the submittal is returned for unrestricted use.

BATTA ENVIRONMENTAL ASSOCIATES, INC.

1. **Surfactant:** Submit product data, use instructions and recommendations from manufacturer of surfactant intended for use. Include data substantiating that material complies with requirements.
 2. **Removal Encapsulant:** Submit product data, use instructions and recommendations from manufacturer of removal encapsulant intended for use. Include data substantiating that material complies with requirements.
 3. **NESHAP Certification:** Submit certification from manufacturer of surfactant or removal encapsulate that, to the extent required by this specification, the material, if used in accordance with manufacturer's instructions, will wet asbestos-containing materials (ACM) to which it is applied as required by the National Emission Standard for Hazardous Pollutants (NESHAP) Asbestos Regulations (40 CFR 61, Subpart M).
- B. Before Start of Work** submit the following to the Owner's Representative for review. Do not begin work until these submittals are returned with the Owner's Representative action stamp indicating that the submittal has been "Received - Not Reviewed".
1. **Material Safety Data Sheet:** Submit Material Safety Data Sheets, or equivalent, in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200) for the following:
 - a. Surfactants.
 - b. Encapsulates.

PART 2 - PRODUCTS:

2.1 MATERIALS

- A. Wetting Materials:** For wetting prior to disturbance of ACM use either amended water or a removal encapsulate:
- B. Amended Water:** Provide water to which a surfactant has been added. Use a mixture of surfactant and water which results in wetting of the ACM and retardation of fiber release during disturbance of the material equal to or greater than that provided by the use of one ounce of a surfactant consisting of 50 percent

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polyoxyethylene ester and 50 percent polyoxyethylene ether mixed with five gallons of water.

- C. Removal Encapsulant:** Provide a penetrating type encapsulant designed specifically for removal of ACM. Use a material which results in wetting of the ACM and retardation of fiber release during disturbance of the material equal to or greater than that provided by water amended with a surfactant consisting of 50 percent polyoxyethylene ester and 50 percent polyoxyethylene ether mixed with five gallons of water.
- D. Polyethylene Sheet:** A single polyethylene film in the largest sheet size possible to minimize seams, 6-mil thick frosted, or black as indicated.
- E. Flame Resistant Polyethylene Sheet:** Provide flame resistant polyethylene film that conforms to requirements set forth by the National Fire Protection Association Standard 701, Small Scale Fire Test for Flame-resistant Textiles and Films. Provide largest size possible to minimize seams, 6-mil thick, frosted or black as indicated.
- F. Reinforced Polyethylene Sheet:** Where plastic sheet is the only separation between the Work Area and building exterior, provide translucent, nylon reinforced, laminated, flame resistant, polyethylene film that conforms to requirements set forth by the National Fire Protection Association Standard 701, Small Scale Fire Test for Flame-resistant Textiles and Films. Provide largest size possible to minimize seams, 6-mil thick, frosted or black as indicated.
- G. Duct Tape:** Provide duct tape in 2 inch or 3 inch widths as indicated, with an adhesive which is formulated to stick aggressively to sheet polyethylene.
- H. Spray Cement:** Provide spray adhesive in aerosol cans that is specifically formulated to stick tenaciously to sheet polyethylene.

PART 3 - EXECUTION

3.1 WORKER PROTECTION:

- A. Before beginning work** with any material for which a Material Safety Data Sheet has been submitted provide workers with the required protective equipment. Require that appropriate protective equipment be used at all times.

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3.2 REMOVAL OF ARCHITECTURAL FINISHES, FIREPROOFING, AND THERMAL SYSTEM INSULATION:

- A. Isolate Work Area:** from the building exterior and other portions of the building. Where existing walls, doors, windows, or other such closure is missing, seal openings with polyethylene sheet at least 6-mil in thickness, mechanically fastened in place and sealed with duct tape or spray glue. Seal broken windows or other openings to the building exterior with nylon-reinforced plastic.
- B. Drop Cloth:** Install a drop cloth consisting of clear 6-mil sheet plastic in any area where asbestos removal work is to be carried out.
- C. Adequately wet:** ACM to be removed prior to stripping and/or tooling to reduce fiber dispersal into the air. Accomplish wetting by a fine spray (mist) of water, amended water or removal encapsulant. Saturate material sufficiently to wet to the substrate without causing excess dripping. Allow time for water, amended water or removal encapsulant to penetrate material thoroughly. If water or amended water is used, spray material repeatedly during the work process to maintain a continuously wet condition. If a removal encapsulate is used, apply in strict accordance with manufacturer's instructions. Perforate outer covering of any installation which has been painted and/or jacketed in order to allow penetration of water, amended water or removal encapsulant, or where necessary, carefully strip away while simultaneously wetting the installation to minimize dispersal of asbestos fibers into the air.
- D. Remove Saturated ACM** in small sections from all areas. Scrape materials from substrate and remove residue using nylon bristled hand brush or high pressure washer. Remove materials in manageable quantities and control the descent to staging or floor below. If height is over 20' use drop chute to contain material during descent. If using water or amended water spray mist continuously during work process. Do not allow material to dry out. As it is removed, simultaneously pack material while still wet into disposal bags. Seal bags, clean outside and move to washdown station adjacent to Material Decontamination Unit.
- E. At Completion of Removal Work:** Clean all surfaces in the removal area by wet wiping, HEPA vacuuming or washing down with hoses. Clean from top down. At Contractor's option a proportional feed nozzle may be used to add a surfactant to the water. Collect any water runoff and filter through a dual filtration system. Provide first filter that removes fibers 20 microns and larger, and a final filter that removes all fibers 5 microns and larger.

BATTA ENVIRONMENTAL ASSOCIATES, INC.

- F. Visual Inspection:** Visually inspect work area for debris. If any visible debris is noted, clean all surfaces in the Work Area again. Continue this procedure until no visible debris is found in the Work Area.
- G. Final Air Testing:** If the Work Area is to remain unoccupied prior to demolition or be occupied only by workers wearing the proper respiratory protection then final air testing is unnecessary. If the area is to be occupied prior to demolition clear the Work Area in accordance with requirements of section 01711 Project Decontamination.

3.3 HAZARDOUS WASTE MANAGEMENT AND DISPOSAL.

- A. Manage and dispose of hazardous waste** such as PCB ballasts, fluorescent light tubes, and mercury thermostats in accordance with the requirements of Section 02086 - Hazardous Waste Management.
- B. Do not mix potentially hazardous waste streams.** Where feasible, separate each type of hazardous waste from other types of hazardous wastes, from asbestos waste and from construction waste.
- C. Segregate, package, label, transport and dispose** of Hazardous Waste in accordance with DOT, EPA, State and Local regulations.

3.4 DISPOSAL OF WASTE:

- A. Pack:** All asbestos-containing or contaminated waste material in bags marked as required by Section 02084 Disposal of Regulated Asbestos-Containing Material.

3.5 REMOVAL OF COMPLETE SYSTEMS:

- A. Before Starting Work of This Section:** Complete the work set forth in the following specification sections:
 - 1.** Section 01527 Local Area Protection
 - 2.** Section 01560 Worker Protection - Asbestos Abatement
 - 3.** Section 01561 Worker Protection - Repair and Maintenance

BATTA ENVIRONMENTAL ASSOCIATES, INC.

4. Section 01562 Respiratory Protection

- B.** Completely seal all components to be removed in 6-mil polyethylene sheet sealed with duct tape. Candy stripe surface of plastic as reinforcement. Wrap large items such as boilers, tanks, and converters with nylon reinforced sheet plastic. Install sheet plastic to allow cutting of components into sections where this is necessary for the work.
- C.** Remove ACM where necessary to allow the cutting components into sections using the procedures set forth in Section 01529 "Mini Enclosures and Glovebags" of these Specifications.
- D.** Remove Components: In largest sections possible.

END OF SECTION - 02061

BATTA ENVIRONMENTAL ASSOCIATES, INC.

SECTION 02062 - NON-ASBESTOS DEMOLITION

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.

1.2 DESCRIPTION OF WORK:

- A. Extent of non-asbestos selective demolition work** is indicated on drawings, and specified in section 01013 of this specification.

1.3 RELATED WORK SPECIFIED ELSEWHERE:

- A. Section 02086 Hazardous Waste Management** describes the management and disposal of hazardous waste such as PCB Ballasts, fluorescent light tubes, and mercury containing thermostats encountered during the work of this section.

1.4 SUBMITTALS:

- A. Schedule:** Submit schedule indicating proposed methods and sequence of operations for non-asbestos demolition work to Owner's Representative for review prior to commencement of work. Include coordination for shut-off, capping, and continuation of utility services as required, together with details for dust and noise control protection.
 - 1.** Provide detailed sequence of demolition and removal work to ensure uninterrupted progress of Owner's on-site operations.
 - 2.** Coordinate with Owner's continuing occupation of portions of existing building.

1.5 JOB CONDITIONS:

- A. Occupancy:** Owner will be continuously occupying areas of the building immediately adjacent to areas of selective demolition. Conduct selective demolition work in manner that will minimize need for disruption of Owner's normal operations. Provide minimum of 72 hours advance notice to Owner of demolition activities which will impact Owner's normal operations.
- B. Condition of Structures:** Owner assumes no responsibility for actual condition of items or structures to be demolished.
 - 1.** Conditions existing at time of commencement of Contract will be maintained by Owner insofar as practicable. However, variations within

BATTA ENVIRONMENTAL ASSOCIATES, INC.

structure may occur by Owner's removal and salvage operations prior to start of selective demolition work.

- C. Partial Demolition and Removal:** Items indicated to be removed but of salvable value to Contractor may be removed from structure as work progresses. Transport salvaged items from site as they are removed.
1. Storage or sale of removed items on site will not be permitted.
- D. Protections:** Provide temporary barricades and other forms of protection as required to protect Owner's personnel and general public from injury due to selective demolition work.
1. Provide protective measures as required to provide free and safe passage of Owner's personnel and general public to and from occupied portions of building.
 2. Erect temporary covered passageways as required by authorities having jurisdiction.
 3. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement, or collapse of structure or element to be demolished, and adjacent facilities or work to remain.
 4. Protect from damage existing finish work that is to remain in place and becomes exposed during demolition operations.
 5. Protect floors with suitable coverings when necessary.
 6. Construct temporary insulated solid dustproof partitions where required to separate areas where noisy or extensive dirt or dust operations are performed. Equip partitions with dustproof doors and security locks if required.
 7. Provide temporary weather protection during interval between demolition and removal of existing construction on exterior surfaces, and installation of new construction to insure that no water leakage or damage occurs to structure or interior areas of existing building.
 8. Remove protections at completion of work.

BATTA ENVIRONMENTAL ASSOCIATES, INC.

- E. Damages:** Promptly repair damages caused to adjacent facilities by demolition work at no cost to Owner.
- F. Traffic:** Conduct selective demolition operations and debris removal 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.
- G. Explosives:** Use of explosives will not be permitted.
- H. Utility Services:** Maintain existing utilities indicated to remain, keep in service, and protect against damage during demolition 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.

PART 2 - PRODUCTS (Not Applicable).

PART 3 - EXECUTION

3.1 INSPECTION:

- A. Prior to commencement of selective demolition work,** inspect areas in which work will be performed. Photograph existing conditions of structure, surfaces, equipment or of surrounding properties which could be misconstrued as damage resulting from selective demolition work. Submit copies of photographs to Owner's Representative prior to starting work.

3.2 PREPARATION:

- A. Decontamination Unit:** Prior to beginning work of this Section complete installation of a Personnel Decontamination Unit as described in Section 01563 Decontamination Units.

BATTA ENVIRONMENTAL ASSOCIATES, INC.

- B. Competent Person:** Work of this Section is to be supervised by an OSHA Competent Person as described in Section 01043 Project Coordination.

- C. Provide interior and exterior shoring,** bracing, or support to prevent movement, settlement or collapse of structures to be demolished and adjacent facilities to remain.
 - 1. Cease operations and notify the Owner's Representative immediately if safety of structure appears to be endangered. Take precautions to support structure until determination is made for continuing operations.

- D. Cover and protect furniture, equipment and fixtures** to remain from soiling or damage when demolition work is performed in rooms or areas from which such items have not been removed.
 - 1. Erect and maintain dustproof partitions and closures as required to prevent spread of dust or fumes to occupied portions of the building.

 - 2. In areas where asbestos abatement work is to follow selective demolition erect barriers to control access as described in section 01562 "Temporary enclosures."

 - 3. Where no asbestos abatement work is to follow selective demolitions and the work is immediately adjacent to occupied portions of the building, construct dustproof partitions of minimum 4 inch studs, 5/8 inch drywall (joints taped) on occupied side, ½ inch fire-retardant plywood on demolition side, and fill partition cavity with sound-deadening insulation.

 - 4. Provide weatherproof closures for exterior openings resulting from demolition work.

- E. Work Site Isolation:** Isolate the site of selective demolition work from occupied portions of the building prior to start of demolition activities. Work site isolation includes:
 - 1. Erection of Critical Barriers as described in Section 01526 Temporary Enclosures

 - 2. Installation and operation of Pressure Differential and Ventilation System as describe in Section 01513

 - 3. Locate, identify, stub off and disconnect utility services that are not indicated to remain

BATTA ENVIRONMENTAL ASSOCIATES, INC.

4. Provide by-pass connections as necessary to maintain continuity of service to occupied areas of building. Provide minimum of 72 hours advance notice to Owner if shutdown of service is necessary during change-over.

3.3 DEMOLITION:

- A. **Perform selective demolition work** in a systematic manner. Use such methods as required to complete work indicated on Drawings in accordance with demolition schedule and governing regulations.
- B. **Demolish concrete and masonry in small sections.** Cut concrete and masonry at junctures with construction to remain using power-driven masonry saw or hand tools; do not use power-driven impact tools, unless approved in writing by Owner's Representative.
- C. **Locate demolition equipment** throughout structure and promptly remove debris to avoid imposing excessive loads on supporting walls, floors or framing.
- D. **Provide services** for effective air and water pollution controls as required by local authorities having jurisdiction.
- E. **Demolish foundation walls to a depth** of not less than 12 inches below existing ground surface. Demolish and remove below-grade wood or metal construction. Break up below-grade concrete slabs.
- F. **For interior slabs on grade,** use removal methods that will not crack or structurally disturb adjacent slabs or partitions. Use power saw where possible.
- G. **Completely fill below-grade areas** and voids resulting from demolition work. Provide fill consisting of approved earth, gravel or sand, free of trash and debris, stones over 6 inch diameter, roots or other organic matter.
- H. **If unanticipated mechanical, electrical or structural elements** which conflict with intended function or design are encountered, investigate and measure both nature and extent of the conflict. Submit report to Owner's Representative in written, accurate detail. Pending receipt of directive from Owner's Representative rearrange selective demolition schedule as necessary to continue overall job progress without delay.

BATTA ENVIRONMENTAL ASSOCIATES, INC.

- I. **Asbestos contamination:** If a disturbance of ACM occurs remove any released material and decontaminate the immediate vicinity of the release in accordance with the requirements of Section 01712 Cleaning & Decontamination Procedures.

3.4 SALVAGE MATERIALS:

- A. **Salvage Items:** Where indicated on Drawings as "Salvage - Deliver to Owner," carefully remove indicated items, clean, store and turn over to Owner and obtain receipt.
 1. Historic artifacts, including cornerstones and their contents, commemorative plaques and tablets, antiques, and other articles of historic significance remain the property of the Owner. Notify Owner's Representative such items are encountered and obtain acceptance regarding method of removal and salvage for Owner.

3.5 HAZARDOUS WASTE MANAGEMENT AND DISPOSAL.

- A. **Manage and dispose of hazardous waste** such as PCB ballasts, fluorescent light tubes, and mercury thermostats in accordance with the requirements of Section 02086 - Hazardous Waste Management.
- B. **Do not mix potentially hazardous waste streams.** Where feasible, separate each type of hazardous waste from other types of hazardous wastes, from asbestos waste and from construction waste.
- C. **Segregate, package, label, transport and dispose** of Hazardous Waste in accordance with DOT, EPA, State and Local regulations.

3.6 DISPOSAL OF DEMOLISHED MATERIALS:

- A. **Remove debris, rubbish** and other materials resulting from demolition operations from building site. Transport and legally dispose of materials off site.
- B. **If hazardous non-asbestos containing materials** are encountered during demolition operations, comply with applicable regulations, laws, and ordinances concerning removal, handling and protection against exposure or environmental pollution.
- C. **Burning** of removed materials is not permitted on project site.

BATTA ENVIRONMENTAL ASSOCIATES, INC.

- D. Disposal of asbestos-containing waste** is not in the work of this section. Disposal of this material is specified in Section 02084 Disposal of Regulated Asbestos Containing Material.

3.7 CLEAN-UP AND REPAIR:

- A. Upon completion** of demolition work, remove tools, equipment and demolished materials from site.
- B. In areas where no asbestos abatement work is to occur**, remove protections and leave interior areas broom clean.
- C. In areas where asbestos abatement work is to occur**, leave protections in place as required by abatement work. Leave area broom clean. Additional cleaning as required for abatement work is not in work of this section.
- D. Repair** demolition performed in excess of that required. Return structures and surfaces to remain to condition existing prior to commencement of selective demolition work. Repair adjacent construction or surfaces soiled or damaged by selective demolition work.
- E. Perform all repair work** in asbestos abatement Work Areas after completion of asbestos abatement work.

END OF SECTION 02062

BATTA ENVIRONMENTAL ASSOCIATES, INC.

SECTION 02063 - REMOVAL OF ASBESTOS CONTAMINATED MATERIALS

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.

1.2 SUMMARY OF WORK:

- A. Work of this section includes** removal and disposal of all non-Asbestos-Containing Material including but not limited to:
 - 1. Ceiling system and supports
 - 2. Removal of all carpeting from within the work area

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Unlabeled Clear Bags:** Provide clear 6-mil thick leak-tight polyethylene bags with no label.
- B. Disposal Bags:** Provide disposal bags as described in Section 02084 "Disposal of Regulated Asbestos-Containing Material"

PART 3 - EXECUTION

3.1 SEQUENCE

- A. Before beginning work of this section** comply with the following sections as they apply:
 - 1. 01503 Temporary Facilities - Asbestos Abatement
 - 2. 01513 Temporary Pressure Differential and Air Circulation System
 - 3. 01563 Decontamination Units

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4. 01526 Temporary Enclosures
5. 01560 Worker Protection - Asbestos Abatement
6. 01562 Respiratory Protection
7. 01527 Regulated Areas
8. 01529 Mini Enclosures and Glovebags
9. 01561 Worker Protection - Repair & Maintenance
10. 01562 Respiratory Protection

3.2 CEILING SYSTEM:

- A. **ACM Contaminated Non-Asbestos Ceiling Tiles:** Remove sufficient ceiling tiles to gain access to top of ceiling system. Mist top of tiles with amended water. Wet sufficiently to soak debris thoroughly, but not cause dripping. Remove ceiling tiles and dispose of tiles as asbestos waste.
- B. **Support System:**
 1. If Removing System: Remove hangers, tracks, T-bars, etc. Decontaminate in Wash Down Station and wrap in clear 6-mil sheet plastic. Dispose of as non-asbestos waste.
 2. If System is to remain: HEPA vacuum all components and wet wipe all surfaces. Encapsulate with an approved encapsulant following visual inspection and approval of Owner's Representative.

3.3 CARPETING:

- A. **Deface carpeting** with a contrasting spray paint before the work. Coat lightly enough that wetting will not be retarded.
- B. **Thoroughly wet asbestos-contaminated carpeting** to be removed to reduce fiber dispersal into the air. Wet carpet prior to cutting, rolling or any other activity that could disturb dust in or under the carpet. Accomplish wetting by a fine spray (mist) of amended water or encapsulant. Saturate material completely without causing excess dripping. Allow time for water or

BATTA ENVIRONMENTAL ASSOCIATES, INC.

encapsulant to penetrate material thoroughly. Spray material repeatedly during the work process to maintain a continuously wet condition. Spraying amended water or encapsulant on carpeting during cutting or rolling to minimize dispersal of asbestos fibers into the air.

- C. Cut seams in the carpeting and roll up** into rolls of carpeting that are no wider than factory width of carpeting. Roll or fold padding as necessary. Remove dust and debris from floor after removal of carpeting and padding by HEPA vacuuming followed by wet wiping.
 - 1.** Wrap the rolled carpeting in two layers of 6-mil sheet plastic. Label and dispose of in accordance with requirements of specification section on "Disposal of Regulated Asbestos-Containing Waste."

3.4 AIRBORNE FIBER LEVELS:

- A. Airborne Fiber Levels:** Maintain airborne fiber levels less than the "Stop Action Levels" set forth in Section 01013 "Summary of Work - Asbestos Abatement."

END OF SECTION - 02063

BATTA ENVIRONMENTAL ASSOCIATES, INC.

SECTION 02081 - REMOVAL OF ASBESTOS-CONTAINING MATERIALS

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.

1.2 RELATED WORK SPECIFIED ELSEWHERE:

- A. Worker Protection** requirements are set forth in Section 01560 Worker Protection - Asbestos abatement.
- B. Installation of Critical and Primary Barriers**, and Work Area Isolation Procedures are set forth in Section 01526 Temporary Enclosures.
- C. Project Decontamination** procedures after removal of the Secondary Barrier are specified in Section 01711 Project Decontamination.
- D. Disposal of asbestos-containing waste** is specified in Section 02084 Disposal of Regulated Asbestos-Containing Material.

1.3 SUBMITTALS:

- A. Before Start of Work:** Submit the following to the Owner's Representative for review. Do not start work until these submittals are returned with Owner's Representative's action stamp indicating that the submittal is returned for unrestricted use.
 - 1. Surfactant:** Submit product data, use instructions and recommendations from manufacturer of surfactant intended for use. Include data substantiating that material complies with requirements.
 - 2. Removal Encapsulant:** Submit product data, use instructions and recommendations from manufacturer of removal encapsulant intended for use. Include data substantiating that material complies with requirements.
 - 3. NESHAP Certification:** Submit certification from manufacturer of surfactant or removal encapsulant that, to the extent required by this specification, the material, if used in accordance with manufacturer's instructions, will wet Asbestos-Containing Materials (ACM) to which it is applied as required by the

BATTA ENVIRONMENTAL ASSOCIATES, INC.

National Emission Standard for Hazardous Pollutants (NESHAP) Asbestos Regulations (40 CFR 61, Subpart M).

- B. Before Start of Work** submit the following to the Owner's Representative for review.
- 1.** Material Safety Data Sheet: Submit Material Safety Data Sheets, or equivalent, in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200) for the following:
 - a. Surfactants.
 - b. Encapsulants.
 - c. Solvents.

PART 2 - PRODUCTS:

2.1 MATERIALS

- A. Wetting Materials:** For wetting prior to disturbance of ACM use either amended water or a removal encapsulant:
- B. Amended Water:** Provide water to which a surfactant has been added. Use a mixture of surfactant and water which results in wetting of the ACM and retardation of fiber release during disturbance of the material equal to or greater than that provided by the use of one ounce of a surfactant consisting of 50 percent polyoxyethylene ester and 50 percent polyoxyethylene ether mixed with five gallons of water.
- C. Removal Encapsulant:** Provide a penetrating type encapsulant designed specifically for removal of ACM. Use a material which results in wetting of the ACM and retardation of fiber release during disturbance of the material equal to or greater than that provided by water amended with a surfactant consisting of one ounce of a mixture of 50 percent polyoxyethylene ester and 50 percent polyoxyethylene ether in five gallons of water.
- D. Polyethylene Sheet:** A single polyethylene film in the largest sheet size practicable to minimize seams, 6-mil thick clear, frosted, or black as indicated.
- E. Flame Resistant Polyethylene Sheet:** Provide flame resistant polyethylene film that conforms to requirements set forth by the National Fire Protection Association Standard 701, Small Scale Fire Test for Flame-resistant Textiles and Films. Provide largest size possible to minimize seams, 6.0 mil thick frosted or black as indicated.

BATTA ENVIRONMENTAL ASSOCIATES, INC.

- F. Duct Tape:** Provide duct tape in 2 inch or 3 inch widths as indicated, with an adhesive which is formulated to stick aggressively to sheet polyethylene.
- G. Spray Cement:** Provide spray adhesive in aerosol cans that is specifically formulated to stick tenaciously to sheet polyethylene.
- H. Disposal Bags:** Provide 6-mil thick leak-tight polyethylene bags labeled as required by Section 02084 Disposal of Regulated Asbestos Containing Material.
- I. Fiberboard Drums:** Provide heavy duty leak tight fiberboard drums with tight sealing locking metal tops.
- K. Paper board Boxes:** Provide heavy duty corrugated paper board boxes coated with plastic or wax to retard deterioration from moisture. Provide in sizes that will easily fit in disposal bags.
- L. Felt:** Standard felt approximately 1/16 inch thick and 36 inches to 72 inches in width

PART 3 - EXECUTION

3.1 SECONDARY BARRIER:

- A. Secondary Barrier:** Over the Primary Barrier, install as a drop cloth a clear 6-mil sheet plastic in all areas where asbestos removal work is to be carried out. Completely cover floor with sheet plastic. Where the work is within 10 feet of a wall extend the Secondary Barrier up wall to ceiling. Support sheet plastic on wall with duct tape, seal top of Secondary plastic to Primary Barrier with duct tape so that debris is unable to get behind it. Provide cross strips of duct tape at wall support as necessary to support sheet plastic and prevent its falling during removal operations.
 - 1. Install Secondary Barrier** at the beginning of each work shift. Install only sufficient plastic for work of that shift.
 - 2. Remove Secondary Barrier** at end of each work shift or as work in an area is completed. Fold plastic toward center of sheet and pack in disposal bags. Keep material on sheet continuously wet until bagged.
 - 3. Install Walkways** of black 6-mil plastic between active removal areas and decontamination units to protect Primary Layer from tracked material. Install walkways at the beginning of, and remove at the end of, each work shift.

BATTA ENVIRONMENTAL ASSOCIATES, INC.

3.2 WORKER PROTECTION:

- A. Before beginning work** with any material for which a Material Safety Data Sheet has been submitted provide workers with the required protective equipment. Require that appropriate protective equipment be used at all times.

3.3 WET REMOVAL:

- A. Thoroughly wet** to satisfaction of Owner's Representative ACM to be removed prior to stripping and/or tooling to reduce fiber dispersal into the air. Accomplish wetting by a fine spray (mist) of amended water or removal encapsulant. Saturate material sufficiently to wet to the substrate without causing excess dripping. Allow time for amended water or removal encapsulant to penetrate material thoroughly. If amended water is used, spray material repeatedly during the work process to maintain a continuously wet condition. If a removal encapsulant is used, apply in strict accordance with manufacturer's written instructions. Perforate outer covering of any installation which has been painted and/or jacketed in order to allow penetration of amended water or removal encapsulant, or use injection equipment to wet material under the covering. Where necessary, carefully strip away while simultaneously spraying amended water or removal encapsulant on the installation to minimize dispersal of asbestos fibers into the air.
 - 1. Mist work area continuously** with amended water whenever necessary to reduce airborne fiber levels.

BATTA ENVIRONMENTAL ASSOCIATES, INC.

- 2. Remove saturated ACM** in small sections from all areas. Do not allow material to dry out. As it is removed, simultaneously pack material while still wet into disposal bags. Twist neck of bags, bend over and seal with minimum three wraps of duct tape (gooseneck). Clean outside and move to Wash Down Station adjacent to Material Decontamination Unit.
 - 3. Evacuate air from disposal bags** with a HEPA filtered vacuum cleaner before sealing bags containing Amosite Asbestos.
- B. Fireproofing or Architectural Finish:** Spray asbestos-containing fireproofing or architectural acoustic finish with a fine mist of amended water or removal encapsulant. Allow time for amended water or removal encapsulant to saturate materials to substrate. Do not over-saturate to cause excess dripping. Scrape materials from substrate. Remove materials in manageable quantities and control the descent to staging or floor below, if over 20 feet use drop chute to contain material during descent. If using amended water, spray mist surface continuously during work process. If using removal encapsulant follow manufacturer's written instructions. Remove residue remaining on scratch coat after scraping using stiff nylon bristled hand brush. Use high pressure washer only with written authorization of Owner's Representative. If a removal encapsulant is used remove residue completely before encapsulant dries. If substrate dries before complete removal of residue re-wet with amended water or removal encapsulant.
- C. Pipe Insulation:** Spray with a mist of amended water or removal encapsulant. Allow amended water or removal encapsulant to saturate material to substrate. If a removal encapsulant is used, use in strict accordance with manufacturer's instructions. Cut bands holding preformed pipe insulation, slit jackets at seams, remove and hand-place in a disposal bag. Remove job-molded fitting insulation in chunks and hand place in a disposal bag. Do not drop to floor. Remove any residue on pipe or fitting with stiff bristle nylon hand brush. In locations where pipe fitting insulation is removed from pipe with straight runs insulated with fibrous glass or other non-asbestos-containing fibrous material, remove fibrous material 6" from the point where it contacts the asbestos-containing insulation.

3.4 DRY REMOVAL:

- A. Dry Removal:** of ACM is required in areas where wetting may create a hazard for workers (Such as Electrical equipment that must remain active, or work areas below 32 degrees F) or damage equipment or finishes.
- 1.** Specific areas requiring dry removal will be specified in section 01013.

BATTA ENVIRONMENTAL ASSOCIATES, INC.

- B. Isolate dry removal area** from balance of Work Area by a Critical Barrier as described in Section 01526 Temporary Enclosures and a pressure differential between the dry removal area and Work Area as described in Section 01513 Pressure Differential System.
- C. EPA Authorization:** Do not begin dry removal work until authorized in writing by the EPA NESHAP coordinator and the Owner's Representative.
- D. OSHA Notification:** Do not begin dry removal work until notification to OSHA required by 29 CFR 1926.1101(g)(4)(6) is made.
- E. Active Electrical Equipment:** Do not wet materials in the vicinity of active electrical equipment. Dry remove any ACM in the vicinity of active electrical equipment.
 - 1. Restrict Access:** Maintain existing access restrictions to areas with active electrical equipment. Allow access to area only to qualified trades persons with prior experience in the installation and repair of involved equipment.
 - 2. Warning Signs:** Post warning signs at the entry point to active electrical equipment as required by OSHA or other applicable regulation.
 - 3. Personnel:** Work on active electrical equipment is to be performed by qualified trades persons with prior experience in the installation or repair of the involved equipment. Restrict access to electrical equipment.
 - 4. Electrical Isolation:** Cover exposed conductors with a minimum 1/8 inch thick neoprene blanket draped over the conductor and surrounding area.
 - 5. Protective Equipment:** Provide workers working on or in the vicinity of active electrical with appropriate protective equipment including insulating gloves, boots, and nonconductive tools.
 - 6. Work Procedures:** Perform removal work using "Localized Control of Material Release" and "Local Ventilation and Collection System" procedures described below.
- F. Hot Equipment:** Do not wet materials on hot piping and equipment. Dry remove any ACM on hot equipment.
 - 1. Restrict access:** Maintain any existing access restrictions to areas with hot equipment. Provide railing or other barriers to prevent accidental contact with hot equipment. Allow access to area only to qualified trades persons with prior experience with the type of equipment involved.

BATTA ENVIRONMENTAL ASSOCIATES, INC.

- 2. Warning Signs:** Post warning signs at hot equipment as required by OSHA or other applicable regulation.
- 3. Personnel:** Work on hot equipment is to be performed by qualified trades persons with prior experience with the type of equipment involved. Restrict access to electrical equipment.
- 4. Re-insulation:** Re-insulate equipment immediately following visual inspection. Do not allow more than 8 linear feet of piping to be exposed at any time.
- 5. Protective Equipment:** Provide workers working on or in the vicinity of hot equipment with appropriate protective equipment including insulating gloves, boots, and coveralls.
- 6. Work Procedures:** Perform removal work using “Localized Control of Material Release” and “Local Ventilation and Collection System” procedures described below.

3.5 LOCALIZED CONTROL OF MATERIAL RELEASE:

- A. Pipe Insulation:** HEPA vacuum surface of pipe insulation. Cut bands holding preformed pipe insulation, slit jackets at seams while holding HEPA vacuum under cut, remove and hand-place in a disposal bag. Remove job-molded fitting insulation in chunks, using nozzle of HEPA vacuum to collect debris generated, and hand-place in a disposal bag. Do not drop to floor. Remove any residue on pipe or fitting with nylon brush. Brushing toward the nozzle of a HEPA vacuum. In locations where pipe fitting insulation is removed from pipe with straight runs insulated with fibrous glass or other non-asbestos-containing fibrous material, remove fibrous material 6 inches from the point where it contacts the asbestos-containing insulation. Use a two worker crew for work, with one worker removing material and one worker holding the nozzle of a HEPA vacuum in the location of disturbance.
- B. Material sprayed on wire lath:** Hold the flex duct inlet from an operating HEPA filtered air filtration device in the immediate vicinity of and below the work while cutting the wire lath or otherwise disturbing the ACM. Use a two-worker crew for cutting, with one worker cutting and one worker holding the HEPA filtration device flex duct inlet.

3.6 LOCAL VENTILATION AND COLLECTION SYSTEM:

- A. Provide local ventilation and collection systems** as described below for each area where amosite or dry ACM is being removed or otherwise disturbed:

BATTA ENVIRONMENTAL ASSOCIATES, INC.

- 1. Provide HEPA filtered fan units in addition** to those required by section 01513, in the vicinity of the work. Arrange so that the units exhaust into the Work Area oriented in a direction away from the work. Extend a 12 inch diameter flexible non-collapsing duct from the intake end to a point no more than 4 feet from any scraping or nylon brushing activity.
- 2. Locate intake** of duct so that air flow is horizontally and slightly downward into intake. Replace primary filters on HEPA filtered fan units at an interval of no greater than 30 minutes. Allow no more than one scraping or nylon brushing activity per fan unit.

3.7 HAZARDOUS WASTE MANAGEMENT AND DISPOSAL

- A. Manage and dispose of hazardous waste** such as PCB ballasts, fluorescent light tubes, and mercury thermostats in accordance with the requirements of Section 02086 – Hazardous Waste Management.
- B. Do not mix potentially hazardous waste streams.** Where feasible, separate each type of hazardous waste from other types of hazardous wastes, from asbestos waste and from construction waste.
- C. Segregate, package, label, transport and dispose** of Hazardous Waste in accordance with DOT, EPA, State and Local regulations.

END OF SECTION - 02081

BATTA ENVIRONMENTAL ASSOCIATES, INC.

SECTION 02082 - REMOVAL OF ASBESTOS-CONTAMINATED SOIL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings and general provisions** of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to work of this section.

1.2 RELATED WORK SPECIFIED ELSEWHERE:

- A. Asbestos abatement project requirements** to be completed prior to start of the work of this section are set forth in the following sections:
 - 1. 01503 Temporary Facilities - Asbestos Abatement
 - 2. 01513 Temporary Pressure Differential & Air Circulation System
 - 3. 01526 Temporary Enclosures - Complete Work Except Delete Floor Plastic.
 - 4. 01560 Worker Protection - Asbestos abatement
 - 5. 01562 Respiratory Protection
 - 6. 01563 Decontamination Units
- B. Asbestos abatement project requirements** to be completed at completion of the work of this section are set forth in the following sections:
 - 1. 01711 Project Decontamination
- C. Amended water and removal encapsulant** are specified in Section 02081 Removal of Asbestos-Containing Materials.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

BATTA ENVIRONMENTAL ASSOCIATES, INC.

3.1 PROCEDURES

- A. Wet Soils:** After removal of the Secondary Barrier and floor layer of Primary Barrier, remove the top one inch (1") of soils which are damp or wet and place in disposal bags. Start removal at the point of work farthest from the entrance to the soil floor area and proceed toward the entrance. Do not permit traffic into the fresh soil surface. Arrange Pressure Differential System so that air flow is the starting point of work toward the entrance. After the entire first layer of soil is removed completely change coveralls and at the entrance to the soil removal area don clean boot covers. Remove the second one inch (1") of soil in the same manner as the first. Carry out the decontamination procedures set forth in the "Project Decontamination" section of this specification at this time. If after performing PLM analysis of bulk soil samples taken following removal of the first two inches of soil there is still asbestos contamination of the remaining soil remove the third and fourth one inch (1") of soil in the same manner as the previous two inches (2").
- B. Dry Soils:** Use the same procedure for dry soils, except saturate soil with amended water or a removal encapsulant as specified in other Division 2 sections of the specification. If a removal encapsulant is used, use in accordance with manufacturer's instructions. Saturate soil beyond the inch of soil currently being removed. If amended water is used keep the surface of the soil continuously wet throughout removal and decontamination.

END OF SECTION - 02082

BATTA ENVIRONMENTAL ASSOCIATES, INC.

SECTION 02084 - DISPOSAL OF REGULATED ASBESTOS-CONTAINING MATERIAL

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.

1.2 RELATED WORK SPECIFIED ELSEWHERE:

- A. Worker protection requirements** are set forth in Sections 01560 Worker Protection - Asbestos abatement
- B. Section 01092 Codes, Regulations and Standards - Asbestos Abatement** describes applicable federal, state and local regulations.

1.3 DESCRIPTION OF THE WORK:

- A. This section describes the disposal of Regulated Asbestos-Containing Materials (RACM).** Disposal includes packaging of Regulated Asbestos-Containing Materials. Disposal may be accomplished either by land filling or converting Regulated Asbestos Containing Materials to non- Asbestos waste.

1.4 SUBMITTALS:

- A. Before Start of Work:** Submit the following to the Owner's Representative for review. Do not start work until these submittals are returned with Owner's Representative action stamp indicating that the submittal is returned for unrestricted use.
 - 1. Copy of state or local license** for waste hauler.
 - 2. Name and address of landfill** where Regulated Asbestos Containing Materials are to be buried. Include contact person and telephone number.
- B. On a weekly basis** submit copies of all manifests and disposal site receipts to Owner's Representative.

BATTA ENVIRONMENTAL ASSOCIATES, INC.

- C. Waste Shipment Record:** Maintain a waste shipment record as required by the NESHAP regulation which indicates the waste generator, transporter, and disposal site, and which describes the nature, size, type of container, and form of asbestos waste. Submit to Owner's Representative within 35 days of departure from building.

PART 2 - PRODUCTS:

2.1 MATERIALS

- A. Disposal Bags:** Provide 6-mil thick leak-tight polyethylene bags labeled with three labels with text as follows:

- 1. First Label:** Provide in accordance with 29 CFR 1910.1200(f) of OSHA's Hazard Communication standard:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD
BREATHING AIRBORNE FIBERS IS
HAZARDOUS TO YOUR HEALTH

- 2. Second Label:** Provide in accordance with U. S. Department of Transportation regulation on hazardous waste marking. 49 CFR parts 171 and 172. Hazardous Substances

RQ-ASBESTOS WASTE
CLASS 9
NA2212-PG III

- 3. Third Label:** Provide the name of the waste generator (Owner's name), the location from which the waste was generated and the names and addresses of the contractor and transporter. This label must be durable, able to repel dirt and moisture (e.g., permanent marker). Label must be placed directly on disposal bag(s) in a legible format. **Peel and stick type labels are expressly prohibited.**

BATTA ENVIRONMENTAL ASSOCIATES, INC.

PART 3 - EXECUTION

3.1 SEQUENCE

- A. Comply with the following sections** during all phases of this work:
 - 1. Section 01560** Worker Protection - Asbestos Abatement
 - 2. Section 01562** Respiratory Protection

3.2 GENERAL:

- A. All waste** is to be hauled by a waste hauler with all required licenses from all state and local authority with jurisdiction.
- B. Liquid waste:** Mix all liquid asbestos-containing waste or asbestos contaminated waste with a bladeable material so that it forms a bladeable (non-liquid) form, and have the concurrence of the landfill operator prior to disposal.
- C. Load all adequately wetted Regulated Asbestos-Containing Material** in disposal bags or leak-tight containers. All materials are to be contained in one of the following
 - 1. Two 6-mil disposal bags** or
 - 2. Two 6-mil disposal bags and a fiberboard drum, make sure any other labels such as company names or product load's are covered or removed before drums are brought on site.**
- D. Protect interior of truck** or dumpster with Critical and Primary Barriers as described in Section 01526 Temporary Enclosures.
- E. Carefully load containerized waste** in fully enclosed dumpsters, trucks or other appropriate vehicles for transport. Exercise care before and during transport, to insure that no unauthorized persons have access to the material.
- F. Warning Signs:** During loading and unloading mark dumpsters, receptacles and vehicles with a sign complying with requirements of the EPA NESHAP regulation (40 CFR Part 61), in a manner and location that a person can read the following legend:

BATTA ENVIRONMENTAL ASSOCIATES, INC.

**DANGER
ASBESTOS DUST HAZARD
CANCER AND LUNG DISEASE HAZARD
Authorized Personnel Only**

- G. Do not store containerized materials outside of the Work Area.** Take containers from the Work Area directly to a sealed truck or dumpster.
- H. Do not transport disposal bagged materials on open trucks.** Label drums with same warning labels as bags. Uncontaminated drums may be reused. Treat drums that have been contaminated as Regulated Asbestos-Containing Material and dispose of in accordance with this specification. Insure any other labels such as company names or product logo's are covered or removed before drums are brought on site.
- I. Advise the landfill operator or processor, at least ten days in advance of transport, of the quantity of material to be delivered.**
- J. At disposal site unload containerized waste:**
 - 1. At a disposal site, sealed plastic bags may be carefully unloaded from the truck.** If bags are broken or damaged, return to work site for rebagging. Clean entire truck and contents using procedures set forth in section 01711 Project Decontamination.
- K. Retain receipts from landfill or processor for materials disposed of.**
- L. At completion of hauling and disposal of each load submit copy of waste manifest, chain of custody form, and landfill receipt to Owner's Representative.**

END OF SECTION - 02084

BATTA ENVIRONMENTAL ASSOCIATES, INC.

**SECTION 02085 - RESILIENT FLOORING REMOVAL
RESILIENT FLOOR COVERING MANUFACTURERS' RECOMMENDED WORK PRACTICES:**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract**, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Drawings and general provisions of the Contract**, including General and Supplementary Conditions and the following Division 1 Specification Sections, may apply to this Section.
 - 1. Section 01013 - Summary of the Work - Asbestos Abatement
 - 2. Section 01028 - Application for Payment - Asbestos Abatement
 - 3. Section 01701 - Contract Closeout - Asbestos Abatement
- C. Work** described by this section relates to work practices as currently set forth in "Recommended Work Practices for the Removal of Resilient Floor Coverings" revised August, 1995, published by:
 - 1. Resilient Floor Covering Institute
966 Hungerford Drive
Suite 12-B
Rockville, MD 20850
 - 2. Armstrong World Industries, Inc.
P.O. Box 3001
Lancaster, PA 17604

1.2 SUMMARY

- A. This Section** includes work practices for removal of resilient floor covering materials which are "intact" and are likely to remain intact during the removal, and can be removed under a negative exposure assessment in compliance with the OSHA standard by appropriately trained workers using the Recommended Work Practices.

BATTA ENVIRONMENTAL ASSOCIATES, INC.

- B. Related Sections:** The following Sections contain requirements that relate to this Section:
- 1. Division 2 Section 02084 "Disposal of Regulated Asbestos-Containing Material"** for disposal of friable asbestos-containing waste. Note that resilient floor covering is defined by the EPA NESHAP regulation as Category 1 non-friable ACM and as such is not covered by Section 02084. Resilient floor covering materials should be disposed of in accordance with any applicable state and local regulations.

1.3 DEFINITIONS

- A. Compliant Work Practices:** Work practices for the removal of flooring material which OSHA has determined will consistently result in exposures below the TWA and excursion limit established by 29 CFR 1926.1101. Recommended Work Practices described in this Section have been recognized by OSHA as Compliant Work Practices.
- B. Recommended Work Practices:** "Recommended Work Practices for the Removal of Resilient Floor Coverings" revised August, 1995, published by the Resilient Floor Covering Institute (RFCI) and Armstrong World Industries, Inc.
- C. Friable:** Material that when dry, can be crumbled, pulverized, or reduced to powder by hand pressure.
- D. Intact:** means that ACM has not crumbled, been pulverized, or otherwise deteriorated so that the asbestos is no longer likely to be bound with its matrix. The incidental breakage of flooring materials, or slicing of sheet vinyl floor covering with a sharp edged instrument, during removal operations conducted in accordance with the Recommended Work Practices does not mean that the materials are not removed in an intact conditions. Intact resilient floor covering materials will be rendered friable if subjected to sanding, sawing or other aggressive operations.
- E. Competent Person:** An individual with the training and experience required by OSHA for a Competent Person involved in removal of intact flooring material using compliant work practices (12 hours of training). The competent person will supervise the work of this section, and is responsible for the health and safety of workers at the flooring material removal job site. The competent person must have authority to stop work, and take corrective action.

BATTA ENVIRONMENTAL ASSOCIATES, INC.

- F. Initial Exposure Assessment:** An inspection made by a Competent Person of the job site prior to the start of removal operations for the purpose of determining if the requirements of a negative exposure assessment are met.

- G. Negative Exposure Assessment:** Based on data in the rulemaking record, OSHA has determined that worker exposures will consistently be below the TWA and excursion limit during removal of intact flooring material when compliant work practices are used. As such, a Competent Person may make a negative exposure assessment when:
 - 1. Recommended Work Practices will be used.
 - 2. Workers are properly trained.
 - 3. The resilient flooring is intact and is likely to remain intact throughout the removal process.

1.4 WORKER PROTECTION

- A. Worker Training:** Workers using the Recommended Work Practices for the intact removal of resilient floor covering materials must have completed an 8-hour training program as required by the OSHA regulation 29 CFR 1926.1101(k) and the Compliance Directive CPL 2-2.63 Appendix D, covering asbestos subjects as well as training in the Recommended Work Practices. Workers with this amount of training only are not permitted to continue working if the material becomes non-intact.

- B. Competent Person:** Engage a person experienced in the use of the Recommended Work Practices who has completed an 8-hour worker training program and additional 4 hours of training as required by the OSHA regulation 29 CFR 1926.1101(k) and the Compliance Directive CPL 2-2.63 Appendix D, for a Competent Person involved in removal of intact flooring material using compliant work practices. Competent Persons with this amount of training only are not permitted to continue working if the material becomes non-intact.

- C. State and Local Requirements:** All workers are to be trained, certified and accredited as required by state or local regulation.

- D. Medical Surveillance:** Workers who engage in the removal of asbestos-containing flooring materials for more than 30 days per year (one hour or more per day) must

BATTA ENVIRONMENTAL ASSOCIATES, INC.

receive medical surveillance. This requires a medical examination within 10 working days following the 30th day of exposure.

- E. Prohibitions in work area:** Require that workers NOT eat, drink, smoke, chew tobacco or gum, or apply cosmetics in the Work Area.
- F. Certificate of Worker Acknowledgment:** Have each worker who is at the job site or who will enter the work area, fill out and sign a copy of the Certificate of Worker's Acknowledgment found at the end of this section.

1.5 QUALITY ASSURANCE

- A. Notifications:** Before the start of Work notify the following of the presence and location of ACM and of the planned removal activity:
 - 1. Employees performing the work.
 - 2. Employers of employees working in the area (not separated from the work area by either a wall, closed door or window or other impermeable barrier).
 - 3. The building owner.
- B. Regulatory Compliance:** Comply with provisions of the following:
 - 1. OSHA Construction Standard for Asbestos 29 CFR 1926.1101
 - 2. OSHA Compliance Directive CPL 2-2.63 November 3, 1995, Inspection Procedures for Occupational Exposures to Asbestos Final Rule 29 CFR Parts 1910.1001, 1926.1101, and 1915.1001. .
 - 3. OSHA 29 CFR 1926.2 through 35
 - 4. AHERA Regulation 40 CFR 763 Sub-Part E
 - 5. Applicable state and local regulations.
- C. Non-Intact Material:** If the resilient flooring materials become non-intact during the work, stop work until the job can be evaluated by a competent person. Do not resume work until:

BATTA ENVIRONMENTAL ASSOCIATES, INC.

1. The job can be evaluated and supervised by a competent person who has completed a training course meeting the criteria of EPA's Model Accreditation Plan for supervisors, and
2. The work will be carried out by workers who have completed training meeting the criteria of the EPA's Model Accreditation Plan for asbestos abatement workers.
3. The work will be carried out in accordance with worker and area protection specified in Section 02087.

1.6 SUBMITTALS

- A. Negative Exposure Assessment:** Before starting any work submit a Negative Exposure Assessment certified by a Competent Person to the Owner or Owner's Representative. If a Negative Exposure Assessment cannot be made, report the reasons and any corrective action that would result in a Negative Exposure Assessment. The certification must be signed and dated by a Competent Person and be based on an Initial Assessment of the work of this contract. A copy of the negative exposure assessment should be retained by the employer of the Competent Person. The certification must include:
1. The name and signature of the Competent Person making the Assessment.
 2. Certification that the Competent Person has been trained as required by OSHA for work on intact resilient flooring.
 3. A description of the work including:
 - a. Name and address of facility where the work is to occur.
 - b. Description of location within the facility where work is to occur.
 4. Certification that:
 - a. Recommended Work Practices will be used.
 - b. Workers will be properly trained as required by OSHA for work on intact resilient flooring.

BATTA ENVIRONMENTAL ASSOCIATES, INC.

- c. The resilient flooring is intact and is likely to remain intact throughout the removal process.
- 5. Complete and submit to the Owner or the Owner's Representative the job form from "Using Compliant Work Practices to Remove Resilient Floor Covering" published by the Resilient Floor Covering Institute (RFCI) and Armstrong World Industries, Inc. This form is to be signed by a Competent Person. Retain a copy of the form.
- 6. Certificate of Worker Acknowledgment: Submit an original signed copy of the Certificate of Worker's Acknowledgment found at the end of this section, for each worker who is to be at the job site or who will enter the work area.

PART 2 - PRODUCTS:

2.1 MATERIALS

- A. **Wetting Materials:** For wetting prior to disturbance of asbestos-containing sheet flooring or asphaltic adhesive, use liquid dishwashing detergent that contains anionic, nonionic, and amphoteric surfactants.
 - 1. **Available Manufacturers:** Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
 - a. Procter & Gamble Ivory Liquid
Cincinnati, Ohio 45202
- B. **Waste Bag:** Large size heavy-duty impermeable trash bag made from 6-mil thick polyethylene. Identify with a label stating "DANGER, CONTAINS ASBESTOS FIBERS, AVOID CREATING DUST, CANCER AND LUNG DISEASE HAZARD".
- C. **Waste Container:** Closed leak-tight container. Identify with a label stating "DANGER, CONTAINS ASBESTOS FIBERS, AVOID CREATING DUST, CANCER AND LUNG DISEASE HAZARD".
- D. **Scrapers:** Broad stiff-bladed wall or floor scrapers. Heavy-duty short or long handled scraper.

BATTA ENVIRONMENTAL ASSOCIATES, INC.

- E. Cutting Sand:** No. 1 sandblasting sand (clean, sharp, coarse cutting sand).
- F. Terrazzo Floor Machine:** Terrazzo or low-speed floor machine fitted with a floor plate attachment (similar to Clark Assembly 500202-6).
- G. Removal Solution:** Solution used to remove adhesive residue. e.g. Mop on, mop off, no machine scrub - wax stripping solution.
- H. Floor Pad:** Black floor scrubbing pad.
- I. HEPA Filter Vacuum Cleaners:** Use wet/dry tank-type vacuum cleaner equipped with a filter and metal floor attachment (no brush).
 - 1. Available Manufacturers:** Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
 - a. Nilfisk of America, Inc. HEPA-Filtered Vacuums
225 Great Valley Parkway
Malvern, PA 19355
(800) 645-3475
 - b. Minuteman International, Inc. Minuteman
111 South Rohlwing Road HEPA Vacuums
Addison, IL 60101
(708) 627-6900
 - c. Pullman-Holt (White) Corporation HEPA-Filtered Vacuums
PO Box 16647
Tampa, FL 33617
(813) 645-3475
- J. Thermal Equipment with Automatic Control:** (open flame and propane fueled devices should not be used).
 - 1. Available Manufacturers:** Subject to compliance with requirements, manufacturers offering products which may be incorporated in the Work include, but are not limited to, the following:

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- a. Enviromethods, Inc. "Delta T" series
P.O. Box 6151
Wolcott, CT 06716
203-879-5527
- b. UAS Automation Systems, Inc. "ATR"(Automated Tile Removal) series
4524 Parkway Commerce Blvd.
Orlando, FL 32808
407-294-8551 or 800-969-8837

- K. Miscellaneous Equipment:** Provide as needed the following equipment: utility or hook knife, ground fault circuit interrupter, hand sprayer, hammer or mallet, commercial-type, hand-held, hot-air gun or radiant heat source, hand-held rubbing stones, slip resistant shoes or boots, chisel, heavy gloves, duct tape, safety glasses.
- L. Use a Ground Fault Circuit Interrupter (GFCI)** for any electrical connections in a wet environment.

PART 3 - EXECUTION

3.1 GENERAL:

- A. Assume an asbestos content:** Unless indicated in the contract documents that a flooring material is a non-asbestos product, assume it contains asbestos and treat it in the manner prescribed by the following procedures which are based on the "Recommended Work Practices for the Removal of Resilient Floor Coverings," published by the Resilient Floor Covering Institute and Armstrong World Industries. Do not sand, dry sweep, dry scrape, drill, saw, beadblast, or mechanically chip or pulverize existing resilient flooring, backing lining felt or asphaltic cut back adhesives.
- B. Before beginning removal** of any resilient flooring materials complete the following
 - 1. Negative Exposure Assessment:** Before starting any work require that a Competent Person make an Initial Exposure Assessment of the resilient flooring to be removed. Begin work only if the Competent Person makes a Negative Exposure Assessment. Based on data in the rulemaking record, OSHA has determined that worker exposures will consistently be below the TWA and excursion limit during removal of intact flooring material when compliant work

BATTA ENVIRONMENTAL ASSOCIATES, INC.

practices are used. As such, a Competent Person may make a negative exposure assessment when:

- a. Recommended Work Practices will be used.
- b. Workers are properly trained.
- c. The resilient flooring is intact and likely to remain intact throughout the removal process.

If a Negative Exposure Assessment cannot be made, report the reasons and any corrective action that would result in a Negative Exposure Assessment.

2. Notifications: Before the start of Work notify the following of the presence and location of ACM and of the planned removal activity:

- a. Employees performing the work.
- b. Employers of employees working in the area (not separated from the work area by either a wall, closed door or window or other impermeable barrier).
- c. The building owner.

3. Demarcation: The work area must be demarcated or access must be limited to workers performing the removal. Post warning signs that read:

DANGER
ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY

4. Preparation: Prior to beginning the removal of resilient floor covering complete the following:

- a. Remove appliances and furniture from the work area.
- b. Remove binding strips or other restrictive molding from doorways, walls, etc.

BATTA ENVIRONMENTAL ASSOCIATES, INC.

- c. Mix a detergent solution (16 ounces of liquid dishwashing detergent to 1 gallon of water) and pour into a garden sprayer.
- d. Clean the entire floor using a wet/dry vacuum cleaner equipped with a HEPA filtration system with disposable bag and metal floor attachment (no brush). Do not dry sweep; do not create dust.
- e. Precaution: Resilient flooring becomes slippery when wet with a detergent solution. Use caution to contain the solution in the immediate work area. Stand on a sheet of plywood or non-slip surface while working on wet surfaces.
- f. After vacuuming, used HEPA filters and cleaner bags should be removed according to manufacturers instructions and place in a waste bag or waste container.

- C. Disposal of materials:** Dispose of friable materials in accordance with Section 02084 ☐ Disposal of Regulated Asbestos Containing Material Dispose of Category I non-friable waste in accordance with State and Local Regulations.

3.2 REMOVAL OF PERIPHERALLY-ADHERED RESILIENT SHEET VINYL FLOORING:

- A. Use the following procedures** to remove adhered portions of the sheet vinyl floor covering:
- 1. The manufacturers recommend that two workers be utilized to perform sheet flooring removal. The Contractor should consider the particular circumstances of the project and determine the advisability of requiring a minimum of two workers as a quality assurance measure.
 - 2. Make a slice with a sharp knife into the adhered floor covering 4 to 8 inches wide, parallel with the walls, around the perimeter of the room.
 - 3. Starting on either side of the entrance door, pry up the corner of the first strip, separating the backing layer. As the strip is being removed, spray a constant mist of the detergent solution into the delamination nip point to minimize any airborne dust particles. When done properly, any felt remaining on the floor and on the back of the strip will be thoroughly wet. Peel the strip either by pulling upward at an angle that permits the best separation or by rolling around a core.

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4. Roll the strip tightly as it is removed. Tie or tape securely and immediately place in a waste bag or waste container for disposal.
5. Remove all of the exposed residual felt by wet scraping, using the procedures under, "Wet Scraping Residual Felt," in this section, before proceeding with removal of the unadhered portion of the floor covering. Residual felt must be removed by wet scraping. Do not sand or dry scrape in any way. Do not dry sweep. Avoid creating dust.
6. Remove additional strips, following the above procedure, as necessary to expose unadhered subfloor area.
7. Continue around the room completely removing the adhered flooring along the perimeter, one strip at a time following the procedures above. Do not remove the flooring at the entrance doorway until all other flooring has been completely removed.
8. Vacuum up any residue of wet felt scrapings immediately with a wet/dry vacuum equipped with a HEPA filter and metal floor attachment (no brush).
9. After vacuuming, used HEPA filters and cleaner bags should be removed according to the manufacturer's instructions and placed in a waste bag or waste container.
10. Remove the unadhered flooring as detailed in the article in this Section on "Removal of Unadhered Resilient Floor Covering".

- B. Disposal of materials:** Dispose of friable materials in accordance with Section 02084 "Disposal of Regulated Asbestos Containing Material". Dispose of Category I non-friable waste in accordance with State and Local Regulations.

3.3 REMOVAL OF UNADHERED RESILIENT FLOOR COVERING:

- A. Use the following procedure** to remove loose laid or the unadhered portion of peripherally adhered sheet resilient floor covering:
1. The manufacturer's recommend that two workers be utilized to perform sheet-flooring removal. The Contractor should consider the particular circumstances of the project and determine the advisability of requiring a minimum of two workers as a quality assurance measure.

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2. Start at the end of the room farthest from the entrance doorway and slice a strip 18 inches wide in the unadhered flooring.
3. Remove the sliced strips while spraying the detergent solution into the separation nip point. Do not stand or kneel on the exposed sub-floor during the removal process.
4. Roll the wet strip tightly and tie or tape to secure. Continue working toward the doorway, slicing each strip and removing it while spraying the separation nip point with the detergent solution. Place the strips while still wet into a waste bag or waste container.
5. After removing three strips of flooring, vacuum the exposed floor using a wet/dry vacuum equipped with a HEPA filter with metal floor attachment (no brush).
6. Seams and other adhered areas should be removed as they are encountered. Strip the wear surface while spraying the detergent solution into the delamination nip point. Wet scrape the residual felt as described under, " Wet Scraping Residual Felt" in this section.
7. Continue removing flooring, doing only one three-strip area at a time, until the entire floor has been completely removed.
8. When the whole floor has been completely removed, let it dry. Vacuum up any dust using a vacuum with a HEPA filtration system and a metal floor attachment (no brush). Stand only in vacuumed areas as work proceeds across the floor. Position the vacuum cleaner so that discharge air does not blow on the floor being cleaned. Do not dry sweep. Avoid creating dust.
9. After vacuuming, used HEPA filters and cleaner bags should be removed according to the manufacturer's instructions and placed in a waste bag or waste container.
10. When floor is dry, install new resilient floor covering following manufacturer's installation recommendations.

- B. Disposal of materials:** Dispose of friable materials in accordance with Section 02084 "Disposal of Regulated Asbestos Containing Material". Dispose of Category I non-friable waste in accordance with State and Local Regulations.

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3.4 REMOVAL OF ADHERED RESILIENT SHEET VINYL FLOORING:

A. Use the following procedure to completely remove adhered resilient sheet flooring.

1. The manufacturers recommend that two workers be utilized to perform sheet flooring removal. The Contractor should consider the particular circumstances of the project and determine the advisability of requiring a minimum of two workers as a quality assurance measure.
2. Make a series of parallel slices, with a knife, 4 to 8 inches apart parallel to a wall.
3. Start at the end of the room farthest from the entrance door. Pry up the corner of the first strip, separating the backing layer. As the strip is being removed, spray a constant mist of the detergent solution into the delamination nip point to minimize any airborne dust particles. When done properly, any felt remaining on the floor and on the back of the strip will be thoroughly wet. Peel the strip either by pulling upward at an angle that permits the best separation or by rolling around a core.
4. Roll the strip tightly as it is removed. Tie or tape securely and immediately place in a waste bag or waste container for disposal.
5. If parts of the foam inner-layer remain stuck to the backing, attempt to eliminate this condition by pulling the strips loose from the opposite end. Peel the foam inner-layer from the floor while spraying the detergent solution into the delamination nip point.
6. Some resilient flooring is not readily strippable by hand. When these conditions are encountered, a sharp stiff blade scraper may be used to assist cleavage of the wear layer from felt. If this procedure is used the distance between slices must be narrowed to a width of 3 to 5 inches.
7. Regardless of whether stripping of the wear surface is accomplished by hand peeling alone or with the assistance of a stiff blade scraper, detergent solution must be sprayed into the delamination nip point to minimize any airborne dust particles.
8. After removing three strips of the wear surface, remove the remaining residual felt by wet scraping using the procedures "Wet Scraping Residual Felt," in this section. During the stripping process, do not stand or walk on the exposed felt.

BATTA ENVIRONMENTAL ASSOCIATES, INC.

9. After removing the three strips of flooring and residual felt vacuum the exposed floor using a wet/dry vacuum equipped with a HEPA filter and metal floor attachment (no brush).
 10. Repeat the operation (wetting the delamination nip point while removing the next three strips, then wet scrape the residual felt, then vacuum the exposed floor). Do only one three-strip area at a time until the entire floor has been completely removed.
 11. Place all flooring strips and felt scrapings immediately while wet into waste bags or waste containers. Close full bags and containers tightly and seal securely for disposal.
 12. Do not dry sweep. Avoid creating dust.
 13. When all floor covering has been completely removed, let the floor dry. Vacuum up any dirt using a vacuum with a HEPA filtration system and a metal floor attachment (no brush). Stand only in the vacuumed area as the work proceeds across the floor. Position the vacuum cleaner so the discharge air does not blow on the floor being cleaned.
 14. After vacuuming, used HEPA filters and cleaner bags should be removed according to manufacturers instructions and place in a waste bag or waste container.
 15. When the floor is dry, it is ready to have a new resilient floor covering installed. Follow the floor covering manufacturer's instructions.
- B. Disposal of materials:** Dispose of friable materials in accordance with Section 02084 "Disposal of Regulated Asbestos Containing Material". Dispose of Category I non-friable waste in accordance with State and Local Regulations.

3.5 WET SCRAPING RESIDUAL FELT:

- A. **Remove any residual felt** remaining on the floor after removal of the wear layer of adhered vinyl sheet flooring by using the following procedure:
 1. Thoroughly wet residual felt with detergent solution. Avoid excessive wetting or standing water. Wait a few minutes to allow solution to soak into felt.

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2. Stand on the remaining floor covering (not the felt) and use a stiff-bladed scraper or a floor scraper with a replaceable blade to remove the wet felt.
 3. Re-wet the felt if the solution has not completely penetrated, if drying occurs or if dry felt is exposed during scraping. Scrape all felt from each three-strip area before proceeding further. Pick up the scrapings as they are removed from the floor and place in a waste bag or waste container.
 4. Wet residual felt as above but do not excessively soak or flood wood floors with detergent solution. Excessive water can damage wood floors to the extent that new underlayment could be required. A floor that has been wet scraped must be allowed to dry thoroughly before new resilient flooring is installed.
 5. As removal progresses, vacuum the area using a vacuum cleaner equipped with a HEPA filter and metal floor attachment (no brush).
 6. After removal is complete and the entire floor has dried, vacuum using a HEPA vacuum with a metal floor attachment (no brush).
 7. After vacuuming, used HEPA filters and cleaner bags should be removed according to the manufacturer's instructions and placed in a waste bag or waste container.
- B. Disposal of materials:** Dispose of friable materials in accordance with Section 02084 ☐ Disposal of Regulated Asbestos Containing Material. Dispose of Category I non-friable waste in accordance with State and Local Regulations.

3.6 REMOVAL OF RESILIENT TILE FLOOR COVERING:

- A. Use the following procedure** to remove resilient tile floor covering:
1. Begin removal in an area that receives the minimum foot traffic.
 2. Floor tiles must be wetted (misted with a garden sprayer) before actual removal begins, unless heat will be used to remove tiles.
 3. Start removal by carefully wedging a wall scraper in the seam of two adjoining tiles and gradually forcing the edge of one of the tiles up and away from the floor. Continue to force the balance of the tile up by working the scraper

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beneath the tile. Exert both a forward pressure and a twisting action on the blade to promote release of the tile from the adhesive and the floor.

4. When the first tile is removed place it, without breaking it further into smaller pieces, in a waste bag or waste container.
5. After the first tile is removed and accessibility to other tiles is improved, force the wall scraper under the exposed edge of another tile. Continue to exert a prying twisting force to the scraper as it is moved under the tile until the tile releases from the floor. Again, dispose of the tile, and succeeding tiles, by placing in a waste bag or waste container without additional breaking.
6. Force the scraper through tightly-adhered areas by striking the scraper handle with a hammer using blows of moderate force while maintaining the scraper at a 25 to 30 degree angle to the floor. The resilient floor covering manufacturers work practices recommend use of safety goggles during this work.
7. Continue to wet (mist) the tiles throughout the procedure
8. It should be the goal to remove individual tiles as a complete unit, although breakage of tiles is unavoidable.
9. If the procedure above is inadequate to loosen tiles use heat to soften adhesive, or alternatively, without first prying up floor tiles using a scraper, thoroughly heat the tile(s) with a hot air gun or radiant heat source until the heat penetrates through the tile and softens the adhesive, and remove tiles by hand or by using a scraper. The resilient floor covering manufacturers work practices recommend that the hot air gun or radiant heat source, tiles and adhesive be carefully handled to avoid burns, and that heated tiles and adhesive be handled only with suitable glove protection for hands. Caution: Over-heating resilient tile might produce harmful vapors, and a respirator with organic cartridges might be needed.
10. Deposit tiles in a waste bag or leak-tight container. Do not attempt to break tiles after they are in bag.

- B. Wet Scrape Residual Adhesive:** As small areas of sub-floor are cleared of tile, wet scrape residual asphaltic "cut-back" adhesive so that no ridges or puddles are evident and what remains is a thin, smooth film.

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1. Start in the corner of the room farthest from the entrance door and moisten an area of the adhesive (approximately 3 by 10 feet) with water mixed with liquid dishwashing detergent (to aid in wetting the adhesive). Wet scrape with a stiff-bladed wall or floor scraper removing ridges and any loose adhesives.
2. Place loosened adhesive residues into a waste bag or waste container
3. Wet vacuum standing water with HEPA wet/dry vacuum.
4. Continue the above steps until what remains of the residual asphaltic "cut-back" adhesive is a thin, smooth film.

C. Wet Remove residue of adhesive from Concrete: Completely remove residue of adhesive left after removal of resilient floor tile using the following procedure:

1. Place cutting sand (enough to cover an area of approximately 6 by 6 foot into a container, add water mixed with liquid detergent (1 ounce of liquid dishwashing detergent to 1 gallon of water) to dampen the sand (20 pounds) of sand to 1 gallon of solution).
2. Place sand over a 6 by 6 foot area and wet remove the existing adhesive residue using a terrazzo floor machine. Keep sand under rubbing stones when operating the machine. The sand and sub-floor must be continuously kept wet.
3. Occasionally push away cutting sand from the sub-floor with a wall or floor scraper to check for complete removal.
4. Remove adhesive around the edge of the room and missed areas with dampened, clean, sharp, cutting sand and a hand held rubbing stone.
5. Wet-scrape sand into a pile using a stiff-bladed floor or wall scraper and place sand and adhesive residue in a waste bag or waste container.
6. Rinse area with clear clean water using a hand sprayer. Worker's boots should also be rinsed and cleaned.
7. Wet-vacuum standing water with HEPA wet/dry vacuum with a metal floor attachment (no brush).
8. Continue with the above steps until the entire room is complete.

BATTA ENVIRONMENTAL ASSOCIATES, INC.

9. Allow sub-floor to dry and vacuum up any remaining dirt or sand using a vacuum equipped with a HEPA filter and metal floor attachment (no brush).
 10. After vacuuming, used HEPA filters and cleaner bags should be removed according to the manufacturer's instructions and placed in a waste bag or waste container.
 11. Wet-wipe and/or wash down all equipment used during the work.
- D. Wet Remove residue of adhesive from Concrete:** Completely remove residue of adhesive left after removal of resilient floor tile using the following procedure:
1. Start in the corner of the room farthest from the entrance door. Put the removal solution onto the residual adhesive with a hand sprayer or mop over a 6' X 6'. Put enough removal solution (e.g. 2 mop on, mop off, no machine scrub stripping solution) to ensure that the area is thoroughly wet. Allow the area to soak for 5-10 minutes. Remove the adhesive using a floor machine equipped with a black floor pad (or equivalent). The sub-floor must be kept continuously wet.
 2. Occasionally push away the adhesive slurry from the sub-floor with a wall or floor scraper to check for complete removal. Continue to use the floor machine, equipped with the black pad, in the same area until the concrete sub-floor is cleaned to the desired degree.
 3. Remove adhesive around the edge of the room, from missed areas, and from areas difficult to reach with the machine with a hand held piece of the black floor pad using the above procedure.
 4. Wet HEPA vacuum the adhesive slurry. When the HEPA vacuum is full, place a commercially suitable water absorbent into the HEPA container until the adhesive slurry is absorbed. Place adhesive waste in a waste bag or waste container.
 5. Rinse area with clear clean water using a hand sprayer or mop. Worker's boots should also be rinsed and cleaned.
 6. Wet-vacuum standing water with HEPA wet/dry vacuum with a metal floor attachment (no brush).

BATTA ENVIRONMENTAL ASSOCIATES, INC.

7. Continue with the above steps until the entire room is complete.
 8. Allow sub-floor to dry and vacuum using a vacuum equipped with a HEPA filter and metal floor attachment (no brush).
 9. After vacuuming, used HEPA filters and cleaner bags should be removed according to the manufacturer's instructions and placed in a waste bag or waste container.
 10. Wet-wipe and/or wash down all equipment used during the work.
- E. **Disposal of materials:** Dispose of friable materials in accordance with Section 02084 "Disposal of Regulated Asbestos Containing Material". Dispose of Category I non-friable waste in accordance with State and Local Regulations.

3.7 REMOVAL OF THIN WOOD UNDERLAYMENT:

- A. **Thin wood underlayment covered with existing sheet vinyl.** Remove thin wood underlayment covered with existing sheet-vinyl-resilient flooring, with the flooring adhered. Use the following procedure:
1. Locate the joints of the underlayment panel farthest from the entrance door.
 2. Slice a strip of the flooring 4 to 8 inches wide centered over the underlayment joint in the panel being removed.
 3. Pry up the corner of the strip separating the backing layer. As the strip is being removed, spray a constant mist of the detergent solution into the delamination nip point to minimize any airborne dust particles. When done properly, any felt remaining on the floor and on the back of the strip will be thoroughly wet. Peel the strip either by pulling upward at an angle that permits the best separation or by rolling around a core.
 4. Roll the strip tightly as it is removed. Tie or tape securely and place in a waste bag or waste container for disposal.
 5. Remove all of the exposed residual felt by wet scraping using the procedures of, "Wet Scraping Residual Felt," in this section before proceeding.

BATTA ENVIRONMENTAL ASSOCIATES, INC.

- 6.** Drive a cold chisel using a hammer or mallet into the joint at a corner of the panel. Now use the chisel to pry the panel up far enough to insert a pry bar. Continue working around the panel, lifting all edges slowly. Use one or two pry bars to pry up the underlayment panel a little at a time until the panel is completely loose and can be removed. Attempt to remove the panel in one piece.
- 7.** If the panel breaks, slice the resilient flooring at the break and spray the detergent solution onto the exposed felt. Allow the solution to penetrate for a few minutes, then continue lifting the broken underlayment.
- 8.** Remove each underlayment panel or piece from the work areas as it is lifted. The resilient floor covering manufacturers work practices recommend that workers wear heavy gloves when handling removed panels, and be very careful of wood splinters and protruding fasteners. Flatten the fasteners with a hammer and stack the panels back to back on pallets or place in dumpster. Identify panels with a label stating, "DANGER, CONTAINS ASBESTOS FIBERS, AVOID CREATING DUST, CANCER AND LUNG DISEASE HAZARD". Dispose of in an approved landfill only.
- 9.** Place any small wood or flooring scrapes in a waste bag or waste container.
- 10.** If the underlayment extends under cabinets or wall partitions, slice through the flooring with a knife as close to the vertical surface as possible, deeply scoring the panel.
- 11.** After each panel has been lifted and removed from the work area, pull up any remaining nails or fasteners in the sub-floor.
- 12.** Continue removing each underlayment panel in sequence following the above procedures.
- 11.** When the underlayment / resilient flooring removal is complete, vacuum with a HEPA filter and metal floor Attachment (no brush).
- 12.** After vacuuming, used HEPA filters and cleaner bags should be removed according to the manufacturer's instructions and placed in a waste bag or waste container.

BATTA ENVIRONMENTAL ASSOCIATES, INC.

B. Removal of thin wood underlayment covered with existing tile. Remove the underlayment with the tile adhered using the following procedure:

1. Floor tiles must be wetted (misted with a garden sprayer) before actual removal begins, unless heat will be used to remove tiles.
2. Starting at the doorway or a floor ventilation vent, locate a joint in an underlayment board.
3. Start removal by carefully wedging a wall scraper in the seam of two adjoining tiles and gradually force the edge of one of the tiles up and away from the floor. Continue to force the balance of the tile up by working the scraper beneath the tile. Exert both a forward pressure and a twisting action on the blade to promote release of the tile from the adhesive and the floor.
4. When the first tile is removed place it, without breaking it further into smaller pieces, in a waste bag or waste container.
5. After the first tile is removed and accessibility to other tiles is improved, force the wall scraper under the exposed edge of another tile. Continue to exert a prying twisting force to the scraper as it is moved under the tile until the tile releases from the floor. Again, dispose of the tile, and succeeding tiles, by placing in a waste bag or waste container, without additional breaking.
6. Force the scraper through tightly adhered areas by striking the scraper handle with a hammer using blows of moderate force while maintaining the scraper at a 25 to 30 degree angle to the floor. Use eye protectives and other protective equipment required for the work.
7. Continue to wet (mist) the tiles throughout the procedure.
8. It should be the goal to remove individual tiles as a complete unit, although breakage of tiles is unavoidable.

BATTA ENVIRONMENTAL ASSOCIATES, INC.

- 9.** If the procedure above is inadequate to loosen tiles use heat to soften adhesive. Thoroughly heat the tile(s) with a hot air gun or radiant heat source until the heat penetrates through the tile and softens the adhesive. The resilient floor covering manufacturers work practices recommend that the hot air gun or radiant heat source, tiles and adhesive be carefully handled to avoid burns, and that heated tiles and adhesive be handled only with suitable glove protection for hands.
- 10.** After all tiles have been removed from the underlayment joints, drive a chisel, using a hammer or a mallet, between the underlayment board and the sub-floor. Use the chisel to pry up the underlayment enough to insert a pry bar and remove the chisel. Slowly and carefully use pry bars to pry up the underlayment board a little at a time until the board is completely loose and can be removed.
- 11.** Use caution to avoid breaking the underlayment board. The underlayment board should be removed in one piece. If the underlayment board breaks, heat and slice the tile at the break, then continue to remove broken underlayment.
- 12.** The Resilient floor covering manufacturers work practices recommend that workers wear heavy gloves and be careful of wood splinter and fasteners sticking out the back of the underlayment. Remove each underlayment board (or piece of board) from the work area as soon as it has been pried up to avoid injuries (such as stepping on a nail). Flatten with a hammer, fasteners protruding from a removed board. Place removed underlayment boards on skids with the nails pointing downward. Wrap skid with 6-mil polyethylene sheet plastic and secure with duct tape. Label panels in the same manner as waste bags.
- 13.** After each board has been removed, pull out any nails or fasteners still in the sub-floor. Dispose of these and any other nails or fasteners that have been removed but are still lying in the work area.
- 14.** After the first board has been removed a chisel is not needed to start removal of boards. Work pry board under the exposed edge of the next board.
- 15.** When removal of underlayment/existing tile floor is complete, thoroughly check the exposed sub-floor. Re-nail loose areas and reset "popped" nails and fasteners.

BATTA ENVIRONMENTAL ASSOCIATES, INC.

- 16.** Vacuum up any dirt in the area using a vacuum cleaner equipped with a HEPA filter and metal floor attachment (no brush).
 - 17.** After vacuuming, used HEPA filters and cleaner bags should be removed according to the manufacturer's instructions and placed in a waste bag or waste container.
- C. Disposal of materials:** Dispose of friable materials in accordance with Section 02084 "Disposal of Regulated Asbestos Containing Material". Dispose of Category I non-friable waste in accordance with State and Local Regulations.

END OF SECTION - 02085

BATTA ENVIRONMENTAL ASSOCIATES, INC.

SECTION 02086 - HAZARDOUS WASTE MANAGEMENT

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.

1.2 RELATED SECTIONS

- A. Section 01092 Codes and Regulations - Asbestos Abatement** describes federal, state and local regulations applicable to asbestos.
- B. Section 02084 Disposal of Regulated Asbestos-Containing Material** describes the handling and disposal of asbestos-containing waste.

1.3 DESCRIPTION OF THE WORK:

- A. This section describes** the segregation, packaging, labeling, transport, and disposal of waste materials generated by demolition activities and the subsequent shipment of properly packaged and labeled waste materials to an approved disposal site.

1.4 CODES AND REGULATIONS

- A. General Applicability of Codes and Regulations:** Except to the extent that more explicit or more stringent requirements are written directly into the Contract Documents, all applicable codes and regulations have the same force and effect (and are made a part of the contract documents by reference) as if copied directly into the Contract Documents, or as if published copies are bound herewith.
- B. Contractor Responsibility:** The Contractor shall assume full responsibility and liability for the compliance with all applicable Federal, State, and local regulations pertaining to hazardous waste management and disposal. Hold the Owner and Owner's Representative harmless for failure to comply with any applicable work, hauling, disposal, safety, health or other regulation on the part of the Contractor, the Contractor's employees, or Subcontractors.
- C. Federal Requirements:** which govern the management, hauling and disposal of hazardous waste include but are not limited to the following:

BATTA ENVIRONMENTAL ASSOCIATES, INC.

- 1. DOT:** U. S. Department of Transportation, including but not limited to:
 - a. Hazardous Substances
Title 49, Part 171 and 172 of the Code of Federal Regulations
 - b. Hazardous Material Regulations
General Awareness and Training Requirements for Handlers, Loaders and Drivers Title 49, Parts 171-180 of the Code of Federal Regulations
 - c. Hazardous Material Regulations
Editorial and Technical Revisions
Title 49, Parts 171-180 of the Code of Federal Regulations
 - 2. EPA:** U. S. Environmental Protection Agency (EPA), including but not limited to:
 - a. Management of Hazardous Wastes Resource Conservation and Recovery Act (RCRA) Title 40, Parts 260- 268 of the Code of Federal Regulations
- D. State Requirements:** Abide by all state requirements which govern the management, hauling and disposal of hazardous waste.
- E. Local Requirements:** Abide by all local requirements which govern the management, hauling and disposal of hazardous waste.

1.5 DEFINITIONS:

- A. Toxicity Characteristic Leaching Procedure (TCLP):** A laboratory test method to determine the mobility of both organic and inorganic analytes present in liquid, solid, and multiphasic wastes performed in accordance with test methods required under 40 CFR Part 268.

1.6 SUBMITTALS:

- A. Before Start of Work:** Submit the following to the Owner's Representative for review. Do not start work until these submittals are returned with Owner's Representative action stamp indicating that the submittal is returned for unrestricted use.
- 1. Copy of state and local licenses** for waste hauler.
 - 2. U.S. EPA Identification Number** of waste hauler.

BATTA ENVIRONMENTAL ASSOCIATES, INC.

3. **Name and address of waste disposal facility** where hazardous waste materials are to be disposed including:
 - a. Contact person and telephone number
 - b. Copy of state license and permit
 - c. Disposal facility permits
 4. **Specimen copy** of Uniform Hazardous Waste Manifest form.
 5. **Copy** of EPA "Notice of Hazardous Waste activity" form.
 6. **Copy** of forms requires by state and local agencies.
 7. **Sample** of disposal label to be used.
- B. During Work:** Submit the following as required by the work.
1. **TCLP test results**, as required to characterize waste for segregation and packaging purposes.
 2. **Submit copies** of all executed manifests and disposal site receipts to the Designer.

PART 2 - PRODUCTS:

2.1 MATERIALS

- A. Disposal Bags:** Provide 6 mil thick leak-tight polyethylene bags.
- B. DOT Hazardous Waste Disposal Drums:** Provide DOT 17-H Open -Top Drums (55 gallon) in accordance with DOT regulations title 49 CFR Parts 173, 178, and 179.
- C. DOT Hazardous Waste Labels:** in accordance with DOT regulations Title 49 CFR parts 173, 178, and 179.

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PART 3 - EXECUTION

3.1 GENERAL

- A. Do not mix potentially hazardous waste streams.** Where feasible, separate each type of hazardous waste from other types of hazardous wastes, from asbestos waste and from construction waste.
- B. Segregate, package, label, transport and dispose** of Hazardous Waste in accordance with DOT, EPA, State and Local regulations.

3.2 HAZARDOUS WASTE DESIGNATION

- A. Where not otherwise designated** by the Owner as Hazardous waste, characterize all suspect waste products by conducting representative TCLP testing.
 - 1. TCLP testing obtained at the site for contractor's use in fulfilling waste management requirements is at contractor's expense.
- B.** Representative sampling of waste products will be in accordance with EPA Document SW 846.
- C.** TCLP test analysis will be performed in accordance with EPA Method 1311.

3.3 HAZARDOUS WASTE:

- A.** The following waste products are designated by the Owner as non-salvageable and as Hazardous Waste Types:
 - 1. **Waste Type A:** PCB waste.
 - a. PCB-containing ballasts from fluorescent light fixtures.
 - b. PCB-containing transformers.
 - c. PCB-containing caulks
 - 2. **Waste Type B:** Mercury-containing waste.
 - a. Thermostats with mercury switches.
 - b. Individually bagged mercury-containing thermostats.
 - c. Fluorescent, and mercury-vapor lamps.

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3.4 Hazardous Waste Packaging and Labeling: Package each segregated Hazardous Waste Type , A and B, in specified containers as follows. **IMPORTANT: Do Not Mix Waste Streams:**

A. Waste Type A

1. Package in DOT 17-H Open-Top Drums
2. Fill to capacity only with Waste Type A (Do Not Mix Waste Stream types).
3. Install gasket on lid, apply lock ring, and seal.
4. Apply Hazardous Waste Label to drum side.
5. Enter DOT Shipping Data as follows: RQ Waste Polychlorinated Biphenols, 9, UN-2315, PG-II, (M001).
6. Adjacent to each label, enter the date indicating when waste was first placed in each drum.

B. Waste Type B

1. Package in DOT 17-H Open-Top Drums with Polyethylene disposal Bag liners
2. Fill liner bags only with Waste Type B (Do Not Mix Waste Stream types); then neck liner bags down into DOT 17-H Open-Top Drum and seal with duct tape.
3. Install gasket on lid, apply lock ring, and seal.
4. Apply Hazardous Waste Label to drum side.
5. Enter DOT Shipping Data as follows: RQ Hazardous Waste Solid, NOS, 9, NA3077, PG-III, (D009).
6. Adjacent to each label, enter the date indicating when waste was first placed in each drum.

C. Sealed and Labeled Containers: maintain all containers in a continuously sealed condition after they have been sealed.

1. Do not reopen sealed containers.
2. Do not place additional waste in sealed containers.

3.5 Temporary Storage: Partially filled containers of hazardous waste may be stored at the work site for intermittent packaging provided that:

- A.** Each container is properly labeled when it is first placed in service;
- B.** Each container remains closed at all times except when compatible waste types are added; and
- C.** When moved from site to site, each container remains within the geographic boundaries of the facility without moving nor crossing public access highways.

BATTA ENVIRONMENTAL ASSOCIATES, INC.

3.6 Removal of Hazardous Wastes: Immediately seal containers of hazardous waste as each the container is filled. Remove containers of hazardous waste from the work site **within seventy-two (72) hours of being filled.**

- A. Transporting filled containers** from the work site to an approved disposal site or recycling center.
- B. Continuously maintain custody** of all hazardous material generated at the work site including security, short-term storage, transportation and disposition until custody is transferred to an approved disposal site or recycling center. Document continuous chain-of custody.
- C. Do not remove,** or cause to be removed, hazardous waste from Owner's property without a legally executed Uniform Hazardous Waste manifest .
- D. At completion of hauling** and disposal of each load submit copy of waste manifest, chain of custody form, and landfill receipt to Owner's Representative.

3.7 Recycling and Recovery: Turn over waste which contains materials for which recovery and/or recycling is possible to an approved recycling center. Materials subject to recycling include:

- A.** Fluorescent light tubes.
- B.** Thermostats with mercury switches.
- C.** Lead acid batteries
- D.** Combustible lead-based painted building components and lead-based paint chips.

3.8 Backcharges:

- A.** Where contractor fails to fulfill packaging, handling, transport or disposal requirements as outlined herein, Owner will charge back to the Contractor all costs associated with insuring that hazardous wastes are segregated, packaged, transported and disposed of in accordance with all applicable Federal and State regulations.
- B.** Environmental pollution of Owner's property or other environments resulting from Contractor's hazardous waste management activities will be promptly remediated under Owner's direction, to the Owner's sole satisfaction, and at the Contractor's sole expense.

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- C. Contractor agrees to either reimburse the Owner, or reduce the Contract amount by change order to cover all costs associated with waste re-packaging, waste re-segregation, or pollution remediation efforts.

3.9 Removal of Non-Hazardous Waste Materials:

- A. Transport and legally dispose of non-hazardous waste products, materials, residues and refuse at a location not on Owner's property.
- B. Non-hazardous waste products, materials, residues and refuse include, but are not necessarily limited to:
 - 1. Materials which are determined to be non-hazardous wastes through objective sampling in accordance with EPA Document SW-846 and laboratory analysis in accordance with EPA Method 1311.
 - 2. Emptied hazardous material containers: containers holding a material with constituents listed on the MSDS as hazardous.
 - a. When a container is emptied of its hazardous contents by pouring or scraping so that less than one inch of material remains in the bottom of the container, the container is considered "empty" and is not in itself a hazardous waste.
 - b. Emptied hazardous material containers may be disposed of as construction debris waste (i.e. non-hazardous).
 - 3. Personnel protective clothing and safety equipment with de minimis or trace contamination, as determined by visual inspection by Owner's Representative.
- C. Keep premises in a clean and orderly condition during performance of abatement work.
- D. Place non-hazardous construction debris wastes on a daily basis in secure containers for local landfill disposal.

END OF SECTION - 02086

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SECTION 02087 RESILIENT FLOORING REMOVAL - AGGRESSIVE 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.

1.2 RELATED WORK SPECIFIED ELSEWHERE:

- A. Asbestos abatement project requirements to be completed prior to start of the work of this section are set forth in the following sections:
 - 1. 01503 - Temporary Facilities - Asbestos Abatement
 - 2. 01513 - Temporary Pressure Differential & Air Circulation System
 - 3. 01526 - Temporary Enclosures
 - 4. 01527 - Regulated Areas
 - 5. 01560 - Worker Protection - Asbestos abatement
 - 6. 01561 - Worker's Protection – Repair and Maintenance
 - 7. 01562 - Respiratory Protection
 - 8. 01563 - Decontamination Units
- B. Asbestos abatement project requirements to be completed at completion of the work of this section are set forth in the following sections:
 - 1. 01711 - Project Decontamination

1.3 SUBMITTALS:

- A. **Before Start of Work:** Submit the following to the Owner's Representative for review. Do not start work until these submittals are returned with Owner's

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Representative's action stamp indicating that the submittal is returned for unrestricted use.

1. Wetting Materials: Submit product data, use instructions and recommendations from manufacturer of wetting material (surfactant and/or removal encapsulant) intended for use. Include data substantiating that material complies with requirements.
 2. NESHAP Compliance Documentation: Submit manufacturer's documentation for removal encapsulants proposed for use that, to the extent required by this specification, the material, if used in accordance with manufacturer's instructions, will comply with the wetting requirements of National Emission Standard for Hazardous Pollutants (NESHAP) Asbestos Regulations (40 CFR 61, Subpart M).
 3. NESHAP Compliance Documentation: Submit written approval from the EPA NESHAP Coordinator, in compliance with applicable requirements of National Emission Standard for Hazardous Pollutants (NESHAP) Asbestos Regulations (40 CFR 61, Subpart M), for the use of shot/bead blast equipment for adhesive removal.
 4. Plan of Action for Dry Ice Use: Submit a plan of action as required by this section for protection of workers from carbon dioxide and cold hazards associated with use of dry ice. Testing and protective measures proposed are to be certified by a Certified Industrial Hygienist (CIH) as defined in Section 01097 "Definitions & Standards - Asbestos Abatement".
 5. Adhesive Removal Solvent: Submit product data, use instructions and recommendations from manufacturer of adhesive removal solvent intended for use. Include data substantiating that material complies with requirements.
- B. Before Start of Work** submit the following to the Owner's Representative for review. Do not begin work until these submittals are returned with the Owner's Representative's action stamp indicating that the submittal has been "Received - Not Reviewed".
1. Material Safety Data Sheet: Submit Material Safety Data Sheets, or equivalent, in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200) for all materials proposed for use on the work including:

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- a. Surfactants.
- b. Adhesive Removal Solvents.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Wetting Materials:** For wetting prior to disturbance of asbestos-containing materials use:
- 1. Amended Water: Provide water to which a surfactant has been added. Use a mixture of surfactant and water which results in wetting of the asbestos-containing material (ACM) and retardation of fiber release during disturbance of the material equal to or greater than that provided by the use of one ounce of a surfactant consisting of 50 percent polyoxyethylene ester and 50 percent polyoxyethylene ether mixed with five gallons (19 liters) of water.
 - 2. Removal Encapsulant: Provide a penetrating-type encapsulant designed specifically for removal of ACM. Use a material which results in wetting of the asbestos-containing material and retardation of fiber release during disturbance of the material equal to or greater than that provided by water amended with a surfactant consisting of one ounce of 50 percent polyoxyethylene ester and 50 percent polyoxyethylene ether mixed with five gallons (19 liters) of water.
 - 3. Dishwashing detergent that contains anionic, nonionic, and amphoteric surfactants.
- B. Foam or Viscous Liquid:** Provide material that contains no organic materials, is non-flammable, presents no physical hazard due to reactivity, presents no acute or chronic health hazard, and does not require special skills, knowledge, or equipment for application.
- C. Tile Adhesive Removal Solvent:** Provide a slow-drying solvent intended to remove tile adhesive. Provide material that is not flammable, does not create combustible vapors and has no significant inhalation hazard.

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1. Provide materials that have less than 250 g/l of volatile organic solvents (VOCs).
- D. **Polyethylene Sheet:** A single polyethylene film in the largest sheet size possible to minimize seams, 6-mil thick, clear, frosted, or black as indicated.
- E. **Flame Resistant Polyethylene Sheet:** In areas with a potential hazard for fire provide flame resistant polyethylene film that conforms to requirements set forth by the National Fire Protection Association Standard 701, Small Scale Fire Test for Flame-resistant Textiles and Films. Provide largest size possible to minimize seams, 6-mil thick frosted or black as indicated.
- F. **Duct Tape:** Provide duct tape in 2 inch or 3 inch widths as indicated, with an adhesive formulated for use on sheet polyethylene.
- G. **Spray Cement:** Provide, in aerosol cans, spray adhesive that is formulated for use on sheet polyethylene. Provide materials that do not contain methylene chloride.
- H. **Disposal Bags:** Provide 6-mil thick leak-tight polyethylene bags labeled as required by Section 02084 Disposal of Regulated Asbestos-Containing Material.
- I. **Fiberboard Drums:** Provide heavy-duty leak-tight fiberboard drums with tight sealing locking metal tops.
- J. **Steel Drums:** Provide leak-tight steel drums with tight sealing locking metal tops.
- K. **Injection Molded Plastic Drums:** Provide leak-tight injection-molded plastic drums with tight sealing locking tops.
- L. **Paper board Boxes:** Provide heavy-duty corrugated paperboard boxes coated with plastic or wax to retard deterioration from moisture. Provide in sizes that will easily fit in disposal bags.
- M. **Polyethylene Boxes:** Provide heavy-duty polyethylene boxes. Provide leak-tight boxes or boxes in sizes that will easily fit in disposal bags.

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2.2 PRIMARY RESILIENT FLOORING REMOVAL EQUIPMENT

A. Manual Spades:

1. Hand operated scraper/chisels with long handles and replaceable blades for removal of resilient flooring.

B. Powered Spades:

1. Long-handled scraper/chisels used in a full-standing position that have replaceable blades and are pneumatically or electrically-powered to move in a reciprocating (in and out) motion.
2. Provide powered spades that are equipped with pneumatic vents and piston seals that prevent compressed air or blow by from sweeping floor.

C. Stripper Machines:

1. These are walking units with blades at the front, driven by electric motors, and move either in a reciprocating (in and out) or an oscillating orbital motion.

D. Rotary Cutters:

1. Machine with rotating discs facing flat against the floor with spring-loaded cutters that follow the profile of the floor and removes soft resilient materials by cutting them into thin strips and scraping them from the floor.

E. Shot Blast/Bead Blast Machines:

1. Machines that send steel shot at high velocity at the floor surface arranged to provide a high-vacuum flow in the blast region to collect dust. Exhaust air is filtered through a HEPA filter. Shot is recollected, separated, and recycled continuously.

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2.3 THERMAL EQUIPMENT WITH AUTOMATIC CONTROL:

A. Thermal Equipment with Automatic Control:

1. Equipment utilizing controlled infrared radiant heat to make the resilient floor tiles and adhesive soft and pliable for removal.

2.4 OTHER TECHNOLOGIES APPLIED TO THE WORK:

A. Rotary Grinders/Surfacers:

1. Machine with discs facing flat against the floor that removes hard materials with a grinding action.

B. Surfacers / Planers/ Scarifiers:

1. Machine with a series of small cutters freewheeling on axles mounted on a drum so that the cutters contact the floor surface with a flailing action.

PART 3 - EXECUTION

3.1 RESILIENT FLOOR COVERINGS:

A. Pre-requisite activities: Before starting removal of ACM using the procedures of this section complete work of the following sections:

1. 01503 - Temporary Facilities - Asbestos Abatement
2. 01513 - Temporary Pressure Differential & Air Circulation System
3. 01526 - Temporary Enclosures - Complete work except delete floor plastic.
4. 01527 - Regulated Areas
5. 01560 - Worker Protection - Asbestos abatement
6. 01561 - Worker Protection - Repair & Maintenance

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7. 01562 - Respiratory Protection
8. 01563 - Decontamination Units

B. Preparation: Prior to beginning the removal of any resilient floor covering complete the following:

1. Remove appliances and furniture from the work area.
2. Mix a detergent solution (16 ounces) of liquid dishwashing detergent to 1 gallon of warm water) and pour into a garden sprayer.

C. Seal Floor Penetrations: Before using wet methods to remove resilient flooring, seal openings, and penetrations in the floor to prevent water leakage.

1. Remove surface mounted junction boxes (doghouses) from raceway system.
2. Remove hatch and trench covers that are covered with resilient flooring. Seal opening with plywood. Seal edges of plywood to floor with urethane foam caulk. Remove resilient flooring from cover in a later operation during wet removal of flooring.
3. Seal openings with a wooden or plywood plug. Seal with urethane foam caulk.
4. Remove flooring material in the immediate area of floor penetrations with a hand spade or scraper.
5. Remove adhesive by hand scraping as necessary to permit installation of seals.
6. Remove any adhesive residue from slab where cover on openings and penetrations must seal to floor to accomplish a watertight assembly. Remove this residue by abrasion using dampened, clean, sharp, cutting sand and a hand-held rubbing stone as necessary. Use minimum wetting required to permit removal. Use caution to prevent water leakage into opening or penetration.
7. Cover sealed plywood hatch cover assemblies with strippable coating. Install strippable coating so that it seals plywood to floor.

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8. Cover sealed openings with strippable coating installed so that it seals opening.
9. Cover sealed plywood hatch assemblies with 6-mil sheet plastic. Seal plastic to floor with spray glue or urethane caulk.
10. Cover sealed openings with sheet plastic. Seal plastic to floor with spray glue or urethane caulk.

D. Remove Resilient Flooring: Use the three-step process described in the following sections:

1. First Step: "Removal of Resilient Tile Floor Covering," and/or "Removal of Resilient Sheet Flooring." This step involves removal of tiles or the wear layer of sheet flooring using a powered spade or stripper machine.
2. Second Step: "Removal of Heavy Residue of Adhesive" and/or "Removal of Residual Backing." This step involves the use of a rotary cutter to remove the bulk of these residual materials. As an alternative hand scraping can be used for this purpose.
3. Third Step: "Removal of Adhesive Residue." After completion of the first two steps there will be a thin residue of adhesive left on the floor. This is removed using a shot/bead blast machine. If the thickness of adhesive residue is too thick to permit effective use of the shot/bead blast machine, repeat the second and third steps.
4. At the completion of all work, leave the substrate in such a state as to comply with all requirements and recommendations of manufacturer of replacement flooring.

3.2 STEP ONE - REMOVAL OF RESILIENT TILE FLOOR COVERING:

A. Remove resilient tile floor covering using the following procedure:

1. **General:**
 - a. Remove binding strips or other restrictive molding from doorways, walls, etc. clean and dispose of as non-asbestos waste. Dispose of any

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materials that have glue or floor mastic on them as asbestos-containing waste.

2. Wet Floor:

- a. Wet floor with amended water, removal encapsulant, or detergent solution, so that entire surface is wet. Do not allow to puddle or run off to other areas. If a removal encapsulant is used, use in strict accordance with manufacturer's instructions. Cover with sheet polyethylene to allow humidity to release tile from floor. Allow time for humidity and water or removal encapsulant to loosen tiles prior to removal.
- b. Keep floor continuously wet throughout removal operation.
- c. Remove tiles using a manual or powered spade, or stripping machine. Continuously mist floor in area where machine is working with amended water, removal encapsulant or detergent solution. Wet any debris generated as necessary to keep continuously wet. Keep floor where tile has been removed continuously wet until after completion of heavy adhesive residue removal.

2. Foam or Viscous Liquid:

- a. Distribute dry foam in a uniform manner over floor. Use sufficient powder to form 1 inch of foam. Wet powder to produce foam. Add additional powder and wet as necessary to maintain 1 inch of foam during the entire removal process.
- b. Remove tiles using a manual or powered spade, or stripping machine. Add additional dry foam powder and wet as necessary to maintain 1 inch of foam during the entire removal process. Maintain layer of foam on floor where tile has been removed until after completion of heavy adhesive residue removal.

B. Debris and Waste

1. Dispose of all friable materials in accordance with Section 02084 Disposal of Regulated Asbestos containing Material. Dispose of Category I non-friable waste in accordance with State and Local Regulations.

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- C. Dry Ice:** Place block (approximately 20 pounds) of dry ice on tile to be removed. Allow to remain in place until the bond between the floor and tile is broken. Do not allow dry ice to remain in one location for more than 15 minutes to avoid frost damage to substrate. Relocate dry ice block to next location to be removed. Store dry ice in ice chest when not in use. Require that workers use insulated gloves while handling dry ice. Provide adequate ventilation to prevent a build up of carbon dioxide in the work area. Use exhaust-type ventilation as described in Section 01513 Pressure Differential and Ventilation System. Do not use a recirculation ventilation system. Provide at a minimum one air change per hour for each block of dry ice in use. Use no more than one block of dry ice per 100 square feet of work area.
1. Develop a plan of action for preventing a hazard from carbon dioxide and cold. Include in this plan of action: a description of type, location, and frequency of air testing that will be performed to detect in advance workers potentially overexposed to carbon dioxide; stop work and evacuation levels, method of correcting and preventing high carbon dioxide levels; protective equipment and work methods to prevent frost bite and protect workers from cold. Automatically and voluntarily stop work and evacuate the work area if a stop work level is measured, or if requested by the owner's representative on the basis of potentially high carbon dioxide levels. If a stop work has occurred, do not restart work until a method has been developed to control carbon dioxide levels and written authorization has been given by the Owner's Representative.

3.3 STEP ONE - REMOVAL OF ADHERED SHEET RESILIENT FLOORING:

- A. Use the following procedure to remove adhered resilient sheet flooring completely:**
1. Wet Floor
 - a. Wet floor with amended water, removal encapsulant, or detergent solution so that entire surface is wet. Do not allow to puddle or run off to other areas. If a removal encapsulant is used, use in strict accordance with manufacturer's instructions.
 - b. Keep floor continuously wet throughout removal operation.
 - c. Remove wear layer using a manual or powered spade, or stripping machine. Continuously mist floor in area where machine is working with amended water, removal encapsulant or detergent solution. Wet any

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debris generated as necessary to keep continuously wet. Keep floor where wear layer has been removed continuously wet until after completion of heavy residue removal.

2. Foam or Viscous Liquid

- a. Distribute dry foam in a uniform manner over floor. Use sufficient powder to form 1 inch of foam. Wet powder to produce foam. Add additional powder and wet as necessary to maintain 1 inch of foam during removal process.
- b. Remove wear layer using a manual or powdered spade, or stripping machine. Add additional dry foam powder and wet as necessary to maintain 1 inch of foam during the removal process. Maintain layer of foam on floor where the wear layer has been removed until after completion of heavy adhesive residue removal.

3. Debris and Waste

- a. Dispose of all friable materials in accordance with Section 02084 Disposal of Regulated Asbestos-Containing material. Dispose of category I Non-Friable Waste in accordance with State and Local regulations.

B. Manual Removal:

1. Make a series of parallel cuts, with a knife, 4 to 8 inches apart parallel to the wall, keeping cut lines wet.
2. Start at the end of the room farthest from the entrance door. This will help avoid tracking of debris from the removal operation. Pry up the corner of the first strip, separating the backing layer. As the strip is being removed, spray a constant mist of the detergent solution into the delamination nip point to minimize any airborne dust particles. When done properly, any felt remaining on the floor and on the back of the strip will be thoroughly wet. Peel the strip either by pulling upward at an angle that permits the best separation or by rolling around a core.
 - a. **PRECAUTION:** Resilient flooring becomes slippery when wet with, amended water, removal encapsulant, or a detergent solution. Use

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caution to contain the solution in the immediate work area. Stand on a new sheet of plywood or non-slip surface while working on wet surfaces.

- 3.** Debris and Waste:
 - a. Roll the strip tightly as it is removed. Tie or tape securely and place in a disposal bag or closed impermeable container for disposal.
- 4.** Occasionally parts of the foam inner-layer will remain stuck to the backing. This condition can sometimes be eliminated by pulling the strips loose from the opposite end. Peel the foam inner-layer from the floor while spraying the detergent solution into the delamination nip point.
- 5.** Some resilient flooring is not readily strippable by hand. When these conditions are encountered, a sharp stiff blade scraper may be used to assist cleavage of the wear layer from felt. If this procedure is used the distance between cuts should be narrowed to 3 to 5 inches wide.
- 6.** Regardless of whether stripping of the wear surface is accomplished by hand peeling alone or with the assistance of a stiff blade scraper, amended water, removal encapsulant or detergent solution must be sprayed into the delamination nip point to minimize any airborne dust particles.
- 7.** Dispose of all friable materials in accordance with Section 02084 Disposal of Regulated Asbestos containing Material. Dispose of Category I non-friable waste in accordance with State and Local Regulations.
- 8.** Place all flooring strips and felt scrapings into disposal bags immediately, while still wet. Close full bags tightly and seal securely for disposal.
- 9.** Keep floor where wear layer has been removed continuously wet until after completion of heavy residue removal.

3.4 STEP TWO - REMOVAL OF HEAVY RESIDUE OF ADHESIVE:

- A.** Remove the heavy residue of adhesive left after removal of resilient tile flooring using the following procedure. If the residual adhesive is sufficiently thin that a shot/bead blast machine or slurry removal can effectively remove the mastic, this step may be skipped and step three started.

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- 1. Dampen Floor**
 - a. Dampen floor by misting with amended water, removal encapsulant, or detergent solution so that entire surface is wet. Do not allow to puddle or run off to other areas. If a removal encapsulant is used, use in strict accordance with manufacturer's instructions.
 - b. Keep floor continuously damp throughout removal operation.
- 2. Adhesive Removal:**
 - a. Begin removal at a point farthest from the entrance to the work area. Work of this step may proceed concurrently with work of removal of tile.
 - b. Remove heavy residue of adhesive backing using a rotary cutting machine. Continuously mist floor in area where machine is working with amended water, removal encapsulant or detergent solution. Wet any debris generated as necessary to keep continuously wet.
- 3. Disposal and Debris**
 - a. Dispose of all friable materials in accordance with Section 02084 Disposal of Regulated Asbestos containing Material. Dispose of Category I non-friable waste in accordance with State and Local Regulations.
- 4. Wet vacuum standing water with HEPA wet/dry vacuum.**
- 5. Mop floor with amended water, removal encapsulant, or liquid detergent solution to remove all debris and residue.**
- 6. Continue the above steps until the adhesive is sufficiently reduced in thickness that it can be effectively removed with shot/bead blast equipment.**
- 7. Start in the corner of the room farthest from the entrance door and moisten an area of the adhesive approximately 3 by 10 feet with amended water, removal encapsulant, or detergent solution. Wet scrape with a stiff-bladed wall or floor scraper removing ridges and any loose adhesives until only a thin smooth film remains. Where deposits are heavy or difficult to scrape, heat with a hot-air blower prior to scraping.**

BATTA ENVIRONMENTAL ASSOCIATES, INC.

- a. Dispose of all friable materials in accordance with Section 02084 Disposal of Regulated Asbestos Containing Material. Dispose of Category I non-friable waste in accordance with State and Local Regulations.
- 8. Wet vacuum standing water with HEPA wet/dry vacuum.
- 9. Mop floor with amended water, removal encapsulant, or liquid detergent solution to remove all debris and residue.
- 10. Continue the above steps until the adhesive is sufficiently reduced in thickness that it can be effectively removed with shot/bead blast equipment.

3.5 STEP TWO - Removal of Residual Backing Material:

- A. Remove any residual felt or rubber backing remaining adhered to the floor after removal of the wear layer of adhered vinyl sheet flooring by using the following procedure:
 - 1. Wetting:
 - a. Thoroughly wet residual backing with amended water, removal encapsulant, or detergent solution. Wait a few minutes to allow solution to soak into felt.
 - b. Concrete floors: Use a rotary cutter, a stiff-bladed scraper, or a floor scraper with a replaceable blade to remove the wet backing.
 - 1) Re-wet the backing if the solution has not completely penetrated, if drying occurs or if dry felt is exposed during scraping. Pick up the scrapings as they are removed from the floor and place in a disposal bag or impermeable container.
 - c. Wood floor: Wet residual felt as above but do not excessively soak or flood wood floors with detergent solution. Excessive water can damage wood floors to the extent that new underlayment could be required. If this occurs, the Contractor will provide new underlayment at no increase in the Contract Sum. Do not use a rotary cutter on wood floors. Use manual scraping only.

BATTA ENVIRONMENTAL ASSOCIATES, INC.

- 2.** Foam or Viscous Liquid:
 - a. Add additional foam dry powder and wet as necessary to maintain 1 inch of foam during the entire removal process.

- 3.** Backing Removal:
 - a. Concrete floors: Use a rotary cutter, a stiff bladed scraper, or a floor scraper with a replaceable blade to remove the wet backing.
 - (1) Re-wet the backing if the solution has not completely penetrated, if drying occurs or if dry felt is exposed during scraping. Pick up the scrapings as they are removed from the floor and place in a disposable bag or impermeable container.

 - b. Wood floor: Wet residual felt as above but do not excessively soak or flood wood floors with detergent solution. Excessive water can damage wood floors to the extent that new underlayment could be required. If this occurs, the Contractor will provide new underlayment at no increase in the Contract Sum. Do not use a rotary cutter on wood floors. Use manual scraping only.

3.6 STEP THREE - REMOVAL OF ADHESIVE RESIDUE:

- A.** After removal of resilient flooring and any heavy residue of adhesive, mastic, or backing material, in the previous step, remove all residue of adhesive from the floor using the following procedure:
 - 1.** Do not use solvents other than water to remove adhesive residue.

 - 2.** Allow floor to dry after completion of the wet removal procedures used in previous steps.

 - 3.** Begin removal at a point farthest from the entrance to the work area.

 - 4.** Remove adhesive residue by either shot/bead blast machine or by slurry removal at the contractor's option.

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3.7 SHOT/BEAD BLAST:

- A.** Remove residue of adhesive from floor using a shot/bead blast machine with dust collection equipment attached to a HEPA-filtered vacuum cleaner.
- B.** If the previous work did not reduce the thickness of adhesive sufficiently to allow effective removal by the shot/bead blast machine, repeat the second step.
- C.** Remove residue at walls and other hard to reach locations with a shot/bead blast edging machine or using dampened, clean, sharp, cutting sand and a hand-held rubbing stone.
- D.** Continue this operation until there is no residue of adhesive on the floor.
- E.** After removal of all residue rinse area with clear clean water using a hand sprayer.
- F.** Wet vacuum standing water with HEPA wet/dry vacuum.
- G.** Continue with the above steps until the entire room is complete.
- H.** Allow floor to dry and vacuum up any remaining dust or dirt using a vacuum equipped with a HEPA filter and metal floor tool (no brush).

3.8 SLURRY REMOVAL:

- A.** Remove residue of adhesive from floor using slurry removal in a manner that keeps the floor in the area of the work continually wet with a slurry of sand and water.
- B.** Place cutting sand (enough to cover an approximate 6 foot by 6 foot area) into a container and add either amended water or water mixed with liquid detergent (1 ounce of liquid dishwashing detergent to 1 gallon of water) to dampen the sand (20 pounds of sand to 2 gallon of solution).
- C.** Place sand over a 6 foot by 6 foot area and wet remove the existing adhesive residue using a terrazzo floor machine. Keep sand under rubbing stones when operating the machine. The sand and subfloor must be continuously kept wet.
- D.** Replace cutting sand periodically as needed to maintain adequate cutting and cleaning of floor. Add sand periodically as required.

BATTA ENVIRONMENTAL ASSOCIATES, INC.

- E.** Occasionally push away cutting sand from the sub-floor with a wall or floor scraper to check for complete removal.
- F.** Remove adhesive around the edge of the room and missed areas with dampened, clean, sharp, cutting sand and a hand-held rubbing stone.
- G.** Wet scrape sand into a pile using a stiff-bladed floor or wall scraper and place sand and adhesive residue in a disposal bag or other impermeable container and dispose of, as required, by Section 02084 Disposal of Regulated Asbestos-Containing Material.
- H.** Rinse area with clear, clean water using a hand sprayer.
- I.** Wet-vacuum standing water with HEPA wet/dry vacuum.
- J.** Continue with the above steps until the entire room is complete.
- K.** Allow sub-floor to dry and vacuum up any remaining dirt or sand using a vacuum equipped with a HEPA filter and metal floor tool (no brush).

3.9 ADHESIVE SOLVENT:

- A. Adhesive:** Remove adhesive residue by using adhesive removal solvents. Use solvents in accordance with manufacturers' instructions. Saturate adhesive with removal solvent and allow adhesive to soften. Remove by scraping, wet sanding, or wet scrub with floor cleaning machine with abrasive pad. Provide worker protection as required by material safety data sheet (MSDS) for any material used.
 - 1.** Mop floor with removal solvent as required by manufacturer's directions as required to completely remove all residue of adhesive.
 - 2.** Clean floor after completion of removal of ACM by wet mopping with amended water. Mop three times allowing a drying time between each mopping.
 - 3.** Encapsulate cleaned floor with one coat of an encapsulant. Use an encapsulant that has been determined not to prevent the bond of new resilient flooring. Follow manufacturer's recommendations for new floor covering installation. Consult with Owner's Representative prior to encapsulating to determine if encapsulation is desired.

BATTA ENVIRONMENTAL ASSOCIATES, INC.

4. Dispose of all rags, plastic sheet, etc. in accordance with requirements of Section 02084 "Disposal of Regulated Asbestos-Containing Material".

B. Decontaminate Equipment: After the completion of all work, decontaminate all equipment and machinery used for work of this section. Accomplish decontamination as required by the section on Project Decontamination.

3.10 WORK AREA CLEARANCE:

A. After completion of all resilient flooring and adhesive removal work and prior to removal of critical barriers, decontamination units, and shut down of pressure differential and ventilation system; complete project decontamination and clearance in accordance with section 01711 "Project Decontamination."

END OF SECTION 02087

BATTA ENVIRONMENTAL ASSOCIATES, INC.

SECTION 02088 - REMOVAL OF ASBESTOS ROOFING MATERIALS

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.

1.2 SUMMARY OF WORK:

- A. Work of this section includes** removal and disposal of all Asbestos-Containing built-up roofing material

1.3 RELATED WORK SPECIFIED ELSEWHERE:

- A. Asbestos abatement project requirements** to be completed prior to start of the work of this section are set forth in the following sections:
 - 1. 01526** - Temporary Enclosures (for Critical Barriers and Screens)
 - 2. 01527** - Regulated Areas
 - 3. 01561** - Worker Protection - Repair & Maintenance
 - 4. 01562** - Respiratory Protection
 - 5. 01563** - Decontamination Units

1.4 TRAINING

- A. Non-Intact Roofing:**
 - 1. Worker Training:** Workers performing removal work on non-intact roofing must have completed an 8-hour training program as required by the OSHA regulation 29 CFR 1926.1101(k) covering asbestos subjects as well as training, including hands-on training, in the work practices and engineering controls specific to roofing removal work and work practices required by 29 CFR 1926.1101(g)(8).

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2. **Competent Person:** Engage a person experienced in roofing work who has completed a 40 hr. EPA/AHERA supervisor training course as required by 29 CFR 1926.1101(o)(4)(l).

B. Intact Roofing:

1. **Worker Training:** Workers performing removal work on intact roofing must be trained as required by the OSHA regulation 29 CFR 1926.1101(g)(11) and as set forth in the Compliance Directive CPL 2-2.63 Appendix D page D-22 to D-23.
2. **Competent Person:** Competent Persons for work on intact roofing must be trained as required by the OSHA regulation 29 CFR 1926.1101(g)(11) and as set forth in the Compliance Directive CPL 2-2.63 Appendix D page D-22 to D-23.

C. State and Local Requirements: All workers are to be trained, certified and accredited as required by state or local regulation.

1.5 SUBMITTALS:

A. Before Start of Work: Submit the following to the Owner's Representative for review. Do not start work until these submittals are returned with Owner's Representatives action stamp indicating that the submittal is returned for unrestricted use.

1. **Surfactant:** Submit product data, use instructions and recommendations from manufacturer of surfactant intended for use. Include data substantiating that material complies with requirements.
2. **Disposal Chute:** Provide a drawing showing disposal chute and how it is to be mounted and supported. Show the relationship of the chute to the dumpster.

B. Before Start of Work submit the following to the Designer for review. Do not begin work until these submittals are returned with the Designer's action stamp indicating that the submittal has been "Received - Not Reviewed".

1. **Material Safety Data Sheet:** Submit Material Safety Data Sheets, or equivalent, in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200) for the following:
 - a. Surfactants.
 - b. Encapsulants.
 - c. Solvents.

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PART 2 - PRODUCTS

2.1 MATERIALS

- A. **Disposal Chute:** Provide a leak tight waste disposal chute to transfer the materials to the ground.
- B. **Polyethylene Sheet:** A single polyethylene film in the largest sheet size possible to minimize seams, 6-mil thick clear, frosted, or black as indicated.
- C. **Flame Resistant Polyethylene Sheet:** Provide flame resistant polyethylene film that conforms to requirements set forth by the National Fire Protection Association Standard 701, Small Scale Fire Test for Flame-resistant Textiles and Films. Provide largest size possible to minimize seams, 6-mil thick, frosted or black as indicated.
- D. **Duct Tape:** Provide duct tape in 2 inch or 3 inch widths as indicated, with an adhesive which is formulated to stick aggressively to sheet polyethylene.
- E. **Spray Cement:** Provide spray adhesive in aerosol cans that is specifically formulated to stick tenaciously to sheet polyethylene.
- F. **Disposal Bags:** Provide 6-mil thick leak-tight polyethylene bags labeled as required by Section 02084 Disposal of Regulated Asbestos Containing Material.
- G. **Fiberboard Drums:** Provide heavy duty leak tight fiberboard drums with tight sealing locking metal tops.
- H. **Paper board Boxes:** Provide heavy duty corrugated paper board boxes coated with plastic or wax to retard deterioration from moisture. Provide in sizes that will easily fit in disposal bags.
- I. **Unlabeled Clear Bags:** Provide clear 6-mil thick leak-tight polyethylene bags with no label.

BATTA ENVIRONMENTAL ASSOCIATES, INC.

PART 3 - EXECUTION

2.2 GENERAL

A. Isolate air intakes

1. Shut down air handling units that draw in fresh air from any area within 30' of the roofing work. Seal all air intakes with 6-mil sheet plastic.
2. Provide horizontal or vertical extension to relocate the opening of air intakes outside or above the regulated area.
3. Use a 20' buffer zone to isolate the work area from openings into the building.
4. Install HEPA filters in fresh air intakes for heating and ventilating equipment

B. Install critical barriers over all openings into building, adjacent buildings, or equipment within 30 feet of the work. Do not cover building surfaces. Erect temporary screens of reinforced sheet plastic as required to prevent wind carrying products of work to any entries of building or occupied portions of the site.

C. Do not sand, abrade or grind roofing materials.

D. Use Manual methods which do not render roofing material "non-intact". These include the use of spud, spade, flat-blade or slicing tools, such as axes, mattocks, pry bars, spud bars, crow bars, shovels, flat-blade knives, and utility knives, to slice, cut, strip-off, shear-under, or pry up the material.

E. Remove roofing materials in an intact state to the extent feasible.

F. Non-intact Built Up Roofing: Perform all removal work on non-intact roofing when outside temperatures are warm enough that the bitumen in the roofing is above the phase change (glass) point. Carry out all roofing removal in a manner that will minimize pulverizing, breaking or abrading of involved materials.

1. **Use Wet Methods** to remove roofing materials that are not intact, or will be rendered not intact during removal, unless wet methods are not feasible or will create safety hazards.

BATTA ENVIRONMENTAL ASSOCIATES, INC.

2. **Non-intact Roof Membrane:** Wet surface of roof with amended water. Use sufficient water to completely wet surface but not cause ponding or running of water. Cut roof membrane into sections able to fit in disposal boxes. Use rotary blade to cut roof. Do not saw. Lift sections from insulation and place in disposal boxes. Bag and dispose of as required by Section 02084 "Disposal of Regulated Asbestos-Containing Material".
 3. **Insulation in a non-intact roof assembly:** Wet insulation with amended water sufficiently to enable it to be removed in a crumbly damp mass. Remove by scraping with roofing hoes. Do not use powered roof rippers. Dispose of insulation as a non-asbestos waste.
 4. **Non-intact Vapor Barrier:** Wet surface of vapor barrier with amended water. Use sufficient water to completely wet surface but not cause ponding or running of water. Scrape vapor barrier from roof deck with roofing hoes. Do not use powered roof rippers. Use water based solvent as required to completely remove vapor barrier and as much roofing bitumen as possible from roof deck. Use a HEPA vacuum or wet sweep into sweep shovels to pick up debris. Dispose of as required by Section 02084 "Disposal of Regulated Asbestos-Containing Material".
- G. Power Roof Cutter:** When removing built-up roofs with a power roof cutter
1. **Continuously mist** the blade of the cutting machine during use unless the competent person determines that misting substantially decreases worker safety.
 2. **Collect dust and debris** resulting from the cutting operation:
 - a. **Aggregate Surface:** Collect all dust resulting from the cutting operation with a HEPA dust collector or by HEPA vacuuming along cut line.
 - b. **Smooth Surface:** Collect all dust resulting from the cutting operation with a HEPA dust collector, by HEPA vacuuming along cut line, or by gently sweeping and then carefully and completely wiping up the still-wet dust and debris left along the cut line
 3. **Immediately bag dust and debris** resulting from the cutting operation or place in covered containers.

BATTA ENVIRONMENTAL ASSOCIATES, INC.

- H. **Do not drop or throw** ACM that has been removed from a roof to the ground. Either carry or pass the ACM to the ground by hand, or lower it to the ground via covered, dust-tight chute, crane or hoist.
 - 1. **Intact ACM** remove from the roof as soon as is practical, but in any event no later than the end of the work shift.
 - 2. **ACM that is not intact** lower to the ground as soon as is practical, but in any event no later than at the end of the work shift. While the material remains on the roof either keep it wet, placed in an impermeable waste bag, or wrapped in plastic sheeting.
- I. **Upon being lowered** transfer unwrapped material to a closed receptacle in such manner so as to preclude the dispersion of dust.

2.3 WARNING SIGNS

- A. **The warning signs** required by this section shall bear the following information.
 - 1. DANGER
ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY
 - 2. DANGER
ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE CLOTHING ARE REQUIRED IN THIS AREA

2.4 DISPOSAL

- A. **Dispose** of all friable materials in accordance with Section 02084 Disposal of Regulated Asbestos Containing Material. Dispose of Category I non-friable waste in accordance with State and Local Regulations.
- B. **Pick up scrapings and debris** and deposit in a disposal bag or closed impermeable container and dispose of as required by Section 02084 "Disposal of Regulated Asbestos-Containing Material".

BATTA ENVIRONMENTAL ASSOCIATES, INC.

2.5 AIRBORNE FIBER LEVELS:

- A. Airborne Fiber Levels:** Maintain airborne fiber levels less than the “Stop Action Levels” set forth in Section 01013 “Summary of Work - Asbestos Abatement”.

END OF SECTION - 02088