ASBESTOS AND CONTAMINANTS OF POTENTIAL CONCERN ABATEMENT AND REMOVAL PLAN

130 LIBERTY STREET
NEW YORK, NEW YORK

Prepared for:

Lower Manhattan Development Corporation
1 Liberty Plaza
New York, New York 10006

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EXECUTIVE SUMMARY

The Lower Manhattan Development Corporation ("LMDC") plans to clean and deconstruct the building located at 130 Liberty Street in the City of New York (the "Building") pursuant to this Deconstruction Plan. LMDC is submitting this Deconstruction Plan to all relevant federal, state, and local regulatory agencies for review to ensure compliance with applicable laws, rules, and regulations. Cleaning, abatement and deconstruction will not commence until the Deconstruction Plan has been approved by such agencies and the required permits and approvals are obtained.

Various studies of contamination in and on the Building previously were performed by LMDC and others. These studies typically analyzed for asbestos and other contaminants of potential concern ("COPCs") designated by the United States Environmental Protection Agency ("EPA") as being associated with World Trade Center ("WTC") dust.

This Abatement and Removal Plan appropriately addresses the asbestos and COPCs identified in prior studies on both the interior and exterior of the Building. By removing and disposing of all contaminants in a safe and controlled manner, the Plan (i) prevents exposure of workers and the public to asbestos fibers and other COPCs, (ii) safeguards workers and the public from construction debris, and (iii) maintains a safe working and neighborhood environment throughout the cleaning and deconstruction process. In furtherance of these goals, as required by applicable law, all interior cleaning and removal will be conducted under containment and negative pressure which will be maintained in each work area until independent, third party air clearance sampling demonstrates that elevated levels of asbestos and other COPCs do not exist. Additionally, all porous deconstruction waste generated prior to successful air clearance sampling will be handled, packaged, transported, and disposed of, at a minimum, as asbestos waste in properly permitted facilities.

The measures set forth herein ensure that workers and the general public are protected from exposure to asbestos and other COPCs. At the same time, they provide for an effective and efficient process to remove this grim reminder of the attacks of September 11th and permit the re-development of Lower Manhattan.

PART 1 - GENERAL

This Asbestos and COPC Abatement and Removal Plan is a component of the overall Deconstruction Plan for 130 Liberty Street, which is being submitted to appropriate regulatory authorities for review and approval to ensure compliance with applicable laws, rules, and regulations.

This Plan is intended to detail the requirements for the Asbestos and COPC abatement needed to complete the overall Deconstruction Plan for 130 Liberty Street in a manner consistent with all Legal Requirements including all Variance Decisions, Variance Decision Amendments and Variance Decision Amendment Clarifications (jointly referred to as "Variance Decisions") granted by the New York State Department of Labor ("NYSDOL") for asbestos abatement. Current Variance Decisions (see Attachments 1, 2, 3, 4, 5, and 6) :

1. Project Variance File No. 04-1432 dated 12 27, 2004
2.
3. Phase I - Variance Decision File No. 05-0427 dated May 11, 2005
4. Phase I - Variance Decision Amendment dated June 10, 2005
5. Phase I - Variance Decision Amendment #1 Clarification dated June 28, 2005
6. Phase I - Variance Decision Amendment #2 dated July 22, 2005

Phase II - Variance Decision File No. 05-0813 dated June 23, 2005

1.01 BACKGROUND

On September 11, 2001, the Building was severely damaged when debris from the WTC broke approximately 1,500 windows and cut a fifteen story gash in the north façade of the Building ("Gash Area"). In addition, a combination of soot, dust, dirt, debris, and contaminants settled in and on the Building. Since September 11, 2001, the Building has been unoccupied. The Gash Area and broken windows exposed the interior of the Building to the elements, which may have caused some further impacts after the initial exposures and events of September 11, 2001.

Subsequent to September 11, 2001, operations were undertaken by the then-owner Deutsche Bank to clear debris from the plaza, lobby, and interior spaces in the Gash Area. A porous geosynthetic mesh or "netting" was hung on the outside of the Building for further protection and safety. The immediate Gash Area was cleaned in accordance with New York City Department of Environmental Protection ("NYCDEP") and New York City Department of Health ("NYCDOH") protocols to permit the construction of columns, beams, and floor decks to stabilize the Gash Area. Once the initial cleaning and stabilization measures were in place, the

majority of the office furniture, equipment, and other non-attached items in the Building were removed and disposed of by Deutsche Bank.

LMDC, the current owner of the Building, plans to clean and deconstruct the Building as part of the redevelopment and rebuilding of the larger WTC Site. Currently, plans for the 130 Liberty Street site include underground truck security and bus parking away from the locations of the former WTC Towers 1 and 2 and a proposed fifth office tower which will reduce the building density on the WTC Site and create approximately 30,000 square feet of open space for public use.

This plan addresses the abatement, cleaning, and removal of contaminants identified in the Building in the September 14, 2004 Initial Building Characterization Study Report[1] and the Supplemental Characterizations[2] published in February 2005 (collectively, "LMDC Studies"). These LMDC Studies analyzed for five COPCs designated by the United States Environmental Protection Agency ("EPA") as being associated with WTC dust (asbestos, dioxins, lead, polycyclic aromatic hydrocarbons ("PAHs"), and crystalline silica), as well as other contaminants suspected of being present in the Building, including polychlorinated biphenyls ("PCBs") and heavy metals (antimony, barium, beryllium, cadmium, chromium, copper, manganese, mercury, nickel, and zinc).

This Abatement and Removal Plan is being submitted to the federal, state, and city regulatory agencies due to the presence of asbestos and other COPCs in the Building. This Abatement and Removal Plan arises from the commitment by LMDC, its consultants, and its contractors to comply in all respects with federal, state, and local laws applicable to the deconstruction of 130 Liberty Street. By doing so, LMDC, its consultants and its contractors will prevent potential exposure of workers and the public to asbestos fibers and other COPCs in the Building, safeguard workers and the public from construction debris and materials, and maintain a safe working and neighborhood environment. Accordingly, LMDC, its consultants and its contractors propose to (i) conduct the abatement work in a protective and expeditious manner in full compliance with applicable law, thereby protecting workers and the public; (ii) to the extent feasible, bulk load waste materials to minimize truckloads, traffic congestion, and air pollution and noise concerns associated with vehicles servicing the site; and (iii) address letters from the regulatory agencies concerning the previously submitted draft Phase I Deconstruction Plan.

This Abatement and Removal Plan was developed and is intended to meet the spirit and intent of the law, by protecting workers and the general public from exposure to asbestos fibers and other COPCs, both inside and outside the Building, in the vicinity of 130 Liberty, and during shipment and ultimate disposal of the deconstruction debris and wastes. This Abatement and Removal Plan, at the same time, addresses unprecedented operational opportunities and challenges arising from unique conditions caused by the events of September 11th and the logistical realities of cleaning and deconstructing a high-rise building in an active urban setting.

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[1] 130 Liberty Street Initial Building Characterization Study Report, The Louis Berger Group, Inc., September 14, 2004.

[2] 130 Liberty Street Supplemental Characterizations, TRC Solutions Inc., issued in February of 2005 as multiple reports.

1.02 PHASING OF WORK

This plan covers all of the activities to be undertaken during the Deconstruction Project, which will occur in the following three phases:

* Phase I - Preparation Phase
* Phase I – Asbestos and COPC Abatement and Removal
* Phase II – Structural Deconstruction

It is the goal of LMDC, its consultants, and its present and future contractors to conduct the proposed cleanup and abatement in a manner which (i) will not expose the general public to asbestos and other COPCs, (ii) will minimize worker exposure to asbestos and other COPCs through the use of appropriate controls and personal protective equipment, (iii) will minimize adverse impacts of the project on the adjacent community, and (iv) will address the practical operational opportunities and challenges presented by the Building and the Building conditions.

NYSDOL and other regulatory agencies have stated that the interior of the entire structure is contaminated with asbestos and other COPCs. This Abatement and Removal Plan addresses Phase I and Phase II of the cleaning and deconstruction project.

The Phase I - Preparation Phase includes the erection of scaffolding and hoists on the full extent of the exterior of the building, construction of interior hoist vestibules, erection of sidewalk sheds and perimeter fencing, exterior negative pressure tent enclosures to implement the Pilot Program, localized roof, façade and general exterior area clean-up and the removal of existing netting on the exterior of the building.

Phase I – Asbestos and COPC Abatement and Removal Phase includes the cleaning and removal of all interior surfaces and non-structural elements within the building under containment. The cleanup and abatement will be conducted so that the building at 130 Liberty (Building) can be safely deconstructed to allow for redevelopment of the WTC Site. Phase I of the Deconstruction Project will occur while the work area is placed under negative pressure containment and includes the following general categories: (a) the general area cleanup of WTC dust and debris, (b) removal and disposal of installed porous and certain non-porous building materials and components, (c) cleaning and salvage of certain installed non-porous building equipment and components, (d) removal of building materials containing asbestos which were present in the Building prior to September 11th, 2001 (referred to herein as “ACBM”), primarily within the Building interior, (e) packaging of asbestos and other regulated waste including, but not limited to light bulbs, lighting ballasts, batteries, mercury-containing thermostats, etc.) at generation points, movement of containers to the decontamination unit and movement of decontaminated containers to waste loading using an exterior hoist or crane, (f) cleaning of exterior surfaces of the Building (i.e. building washdown), and (g) installation of tower crane.

Phase I will include: cleaning of settled dust and debris (above and below the plenum, within HVAC and other Building systems, and in interstitial spaces), removal of ACBMs, removal of interior building components, and removal of interior non-structural building elements (such as gypsum wall board (“GWB”), small scale mechanical, electrical and plumbing (“MEP”) and sprayed-on fireproofing (“SOFP”)). The entire interior of the Building, with the exception of

certain concrete masonry unit ("CMU") shafts and non-porous mechanical equipment and shafts, will be removed under Phase I.

During all Phase I activities, a minimum buffer zone of three floors initially for the top three floors and then two floors thereafter, will be maintained between the active abatement and clean-up (Phase I– Asbestos and COPC Abatement and Removal) area and the structural demolition (Phase II) portion of the project.[3] The proposed cleanup and abatement will be conducted so that the Building can be safely deconstructed in compliance with applicable law to allow for redevelopment of the WTC Site.

All Phase I - Asbestos and COPC Abatement and Removal activities and Phase II activities, relating to exterior abatement, shall be conducted by a NYSDOL/ NYCDEP licensed Asbestos Abatement Contractor under controlled conditions and all resultant debris will be treated as asbestos waste (at a minimum) and/or as hazardous waste, universal waste and/or regulated waste (as may be appropriate) and packaged, labeled, handled, transported and disposed of in accordance with all applicable local, state and federal statutes and regulations, including but not limited to NYSDOL Industrial Code Rule ("ICR") 56 and NYSDOL Approved Variance Decision File No. 04-1432, 05-0427 and 05-0813. It is anticipated that work areas of approximately four (4) or less floors will be established. Porous demolition debris and porous material within the work area shall be disposed of as asbestos waste, at a minimum. Non-porous salvage items may be decontaminated and released as specified in Industrial Code Rule 56-8.2.

There may be exceptions to the general sequencing of Phase I work activities. Phase I **-** Preparation Phase activities will require the licensed abatement contractor to clean some limited, designated exterior surfaces and to create several limited clean containments or sealed penetrations to facilitate the installation of the scaffolding and exterior hoist systems. This work will occur as required and not necessarily in the "top down" sequence presented above. Second, the licensed abatement contractor may need to clean areas of the basements out of sequence to prepare for and facilitate some Phase II work. Third, the licensed abatement contractor must clean access areas required for Phase II activities; including emergency egresses. In such cases Phase I - Preparation Phase work may be performed out of sequence. The requirements for this work are further detailed within this Abatement Plan.

All mold and bacteriological contamination identified during the LMDC Studies will be addressed concurrently with abatement activities. Since all porous building materials as well as any mold and/or bacteriological contaminated materials will be handled, at a minimum, as asbestos waste, no additional special handling requirements are necessary to address mold and bacteriological contamination. All health and safety protocols regarding the handling of these materials are addressed in Section 5 (Health and Safety Plan) of the Deconstruction Plan.

Once the Phase I - Preparation Phase activities are completed, the minimum Phase I - Asbestos and COPC Abatement and Removal buffer zone is established and the Phase I exterior façade cleaning and roof abatement is completed, previously cleaned and cleared floors may be deconstructed under Phase II. Personnel involved with Phase II activities will access their work areas utilizing a "clean" exterior hoist or any other pre-cleaned/ cleared access route and shall only be permitted to work in previously cleaned and cleared areas.

Phase II will include the systematic floor-by-floor deconstruction and removal of the remaining "clean" building components including the clean exterior curtain wall, roof, CMU shafts, concrete deck, large scale mechanical equipment components and structural steel components. Included in Phase II will be the abatement and removal of roof-top asbestos-containing cooling tower transite materials, rooftop caulking and asbestos-containing caulking found on the aluminum column covers and fascia.

1.03 BUILDING DESCRIPTION

In the LMDC Studies, the Building was divided into six (6) zones which are representative of the various areas of the Building. They include:

- Zone 1 - Mechanical Rooms on the 5th, 6th, 40th, and 41st Floors to include the air intakes, fan rooms, and air handling units of the HVAC system.
- Zone 2 - Office Space located at or below the 24th Floor that may have been subjected to dust entering the Building through the Gash, HVAC system (and possibly circulated through the HVAC system), vertical shafts, or broken windows.
- Zone 3 - Office Space located above the 24th Floor that may have been impacted by dust distributed through the HVAC system, vertical shafts, or broken windows.
- Zone 4 - Gash Area that was cleaned by Deutsche Bank subsequent to September 11, 2001 to permit structural work to be performed.
- Zone 5 - Roof Area that may have been impacted by the settling or adhesion of dust to the exterior surfaces.
- Zone 6 - Exterior façade building materials.

The Building is a structural steel framed building with metal deck, concrete slabs, and an aluminum exterior curtain wall system. Interior features include raised access flooring, acoustical ceiling systems, drywall partitions, other finishes, elevators, escalators, HVAC ductwork and other MEP piping and equipment, and drywall and core board shafts. SOFP is found on structural steel including beams, interior vertical columns, ceiling deck, and perimeter column materials. Concrete masonry unit ("CMU") walls are limited to 1) building core stairwells, elevators, MEP shafts (vertical shafts) between Cellar B and the 3rd Floor, 2) some limited walls at the 39th floor and above and 3) minor continuous vertical utility shafts (three).

Unique building features include Walker ducts and raceways (cell systems). The cell systems are essentially two layers (one in a North-South orientation and the other in an East-West orientation) of electrical and telecommunication cable ducts that traverse the floor within the concrete slabs that comprise the floor. The cell system facilitated the routing of electrical and telecommunication cables from the associated closets to terminals within the office. The cell system is accessed via circular access ports located throughout the floor.

Miscellaneous building components include: light bulbs, light ballasts, mercury thermostats, batteries, and refrigerants.

Typical ceiling heights within the building are 1) Office Floors 12'-13', 2) Data Center Floors 13'-15' and 3) Cellar 16'. Exceptions to these typical ceiling heights are Tenant Floor Nos. 1 (21'), 2 (17.7'), 3 (18'), 5 (28') and 40 (17.2').

The Building has been vacant for a period in excess of three years. Therefore, concern exists about the reliability and operability of various Building system components necessary to support the project, specifically elevators.

1.04 ROLES AND RESPONSIBILITIES

The roles and responsibilities for this project are outlined in the Health and Safety Plan. Specific roles for the licensed abatement contractor and Environmental Consultant in managing work areas, decontamination systems, and waste load out areas will be outlined prior to commencing work.

1.05 AUTHORITY TO STOP WORK

The Regulators, the Owner, the Contractor, and the Environmental Consultant Project Monitor shall have the authority to stop the abatement work based upon violations of applicable law, the HASP, the Abatement and Removal Plan, the Permits, and/or any approved variances. The stoppage of work shall continue until conditions have been corrected to the satisfaction of the Owner's representative and Owner's Environmental Consultant Project Monitor. In addition, the occurrence of any or all of the following events will be reported in writing to the Environmental Consultant Project Monitor and will require the licensed abatement contractor to stop abatement activities and initiate appropriate corrective actions:

A. Excessive airborne fibers outside containment area (0.01 f/cc or above (via PCM) or in excess of background fiber levels, whichever is greater).
B. Exceedances of US EPA Trigger Levels as contained within the Ambient Air Monitoring Program (Section 2 of the Deconstruction Plan).
C. Break in containment barriers.
D. Loss of negative air pressure (at or below 0.02 inches of water column).
E. Serious injury within the containment area.
F. Fire or other safety emergency.
G. Power failure affecting the abatement process or the maintenance of negative air pressure.

1.06 UTILITIES AND SITE REQUIREMENTS

A. Wastewater: Any excess or free wastewater generated shall be collected by the licensed abatement contractor during abatement activities and passed through a water filtration system capable of filtering particles down to 5 microns prior to being discharged into the sanitary sewer. Water will be used from a 2-inch water riser that will be installed by the Contractor. All spent filters shall be containerized and undergo waste characterization in accordance with procedures outlined within Section 1 of the Deconstruction Plan.

B. Fire Extinguishers - As per Section 3 of the Emergency Action Plan, Section 4.1.1, portable fire extinguishers will be strategically positioned throughout the Building. If necessary, temporary fire suppression systems may be utilized to supplement any identified building system deficiencies.

C. Job Site Postings - The licensed abatement contractor shall post in the Cellar "A" decontamination system area and have available for review all applicable laws, rules, and regulations required to be posted or available for review. These include but are not limited to the following:

1. A copy of the US EPA Regulations for Asbestos, 40 CFR 61 Subparts A and M; a copy of OSHA Asbestos Regulations, 29 CFR 1926.1101; and a copy of NYS ICR 56.

2. A copy of NYCDEP permits and conditions**.**

3. A copy of Worker's NYS DOL and NYCDEP Asbestos Handler Licenses/Certificates for each worker on the site

4. A copy of all applicable US EPA, NYS DOL and NYC DEP Notifications and Approved Variances.

5. A copy of Deconstruction Plan Section 3 - Emergency Action Plan– with the list of emergency contacts and telephone numbers, location of nearest hospital and emergency response agencies (the list of emergency contacts and telephone numbers, location of nearest hospital and emergency response agencies will also be posted at the decontamination unit entrance).

6. A copy of all Material Safety Data Sheets (MSDS) for chemicals used during the asbestos project.

7. A copy of Deconstruction Plan Section 5 – HASP.

8. A copy of waste hauler information, including but not limited to the location of the waste site, permits and licenses.

9. A copy of licensed abatement contractor's NYS DOL and NYCDEP Asbestos Contractor licenses

10. The licensed abatement contractor's OSHA personal monitoring results.

11. The Environmental Consultant Project Monitor's daily air sampling results.

1.07 FIRE PROTECTION/ EMERGENCY EGRESS/ SAFETY

The Contractor shall be responsible for the security and safeguarding of all areas. The licensed abatement contractor shall designate to its workers the means of egress in case of emergency.

A. The licensed abatement contractor shall establish emergency and fire exits from the work area. This information is found in Section 3 (Emergency Action Plan) of the 130 Liberty Street Deconstruction Plan. First aid kit(s), a minimum of six (6) full sets of protective clothing, and six (6) Powered Air Purifying Respirators (PAPRs) shall be provided for use by qualified emergency personnel in the clean room of the decontamination facility.

B. The licensed abatement contractor shall provide a fire watch during all work activities to protect against fire. Fire watch shall be a certified asbestos handler by New York State Department of Labor (NYSDOL) and HAZWOPER trained.

C. Fire protection shall be provided via a dry standpipe system to be located centrally on each floor in accordance with all applicable NYC Building Department or FDNY requirements. Both the dry standpipe and the 2" water line will be available for fire protection and fire prevention at all times during the deconstruction operation.

D. All abatement personnel shall utilize stairwells 'A' and 'B' and deconstruction personnel shall use exterior scaffold stair towers for emergency egress during Deconstruction activities. Refer to the Emergency Action Plan found within Section 3 of the Deconstruction Plan for more details.

PART 2 – WORK PLAN

Phase I - Preparation Phase activities support installation of the scaffolding, exterior hoist and erection of sidewalk sheds and perimeter fencing. Preparation Phase activities are localized in nature and may precede the initiation of full scale Phase I Abatement activities within a particular floor or area of the building. Preparation Phase activities represent a subset of the defined Phase I activities, and will be performed in conformance with all applicable Variance Decisions for this Project.

Phase I - Asbestos and COPC Abatement and Removal includes the necessary interior, non-structural deconstruction and related work. Phase I will include: cleaning of settled dust and debris (above and below the plenum, within HVAC and other Building systems, and in interstitial spaces), removal of ACBMs, removal of interior building components, and removal of interior non-structural building elements (such as gypsum wall board ("GWB"), small scale mechanical, electrical and plumbing ("MEP") and sprayed-on fireproofing ("SOFP")). The entire interior of the Building**,** with the exception of certain CMU shafts and non-porous mechanical equipment and shafts, will be removed under Phase I.

Cleaning and abatement shall occur while the interior building work area is placed under negative pressure containment and includes, but is not limited to, the removal and disposal of all interior non-structural items from the Building. The entire interior of the Building, with the exception of certain CMU shafts and non-porous mechanical equipment and shafts, shall be removed under Phase I. All materials shall be treated as asbestos, at a minimum, and shall be

appropriately managed, handled, packaged, transported and disposed of by the Contractor.

Phase II will include the systematic floor-by-floor deconstruction and removal of the remaining "clean" building components including but not limited to the clean exterior curtain wall, roof, CMU shafts, concrete deck, large scale mechanical equipment and structural steel components. Included in Phase II will be the abatement and removal of roof-top asbestos-containing cooling tower transite materials, rooftop caulking and asbestos-containing caulking found on the aluminum column covers and fascia.

All work shall comply with applicable regulations including NYSDOL approved Variance Decision File Numbers 04-1432, 05-0427 and 05-0813 (attached).

2.01 ESTABLISHING PERSONNEL DECONTAMINATION ENCLOSURE SYSTEM

REMOTE PERSONNEL DECONTAMINATION ENCLOSURE SYSTEM

Use of a remote personnel decontamination enclosure system ("decon") will be limited to exterior work, interior negative pressure tent enclosures. The following activities are permitted to be conducted utilizing remote personnel and waste decon units:

- Netting removal;
- Exterior façade cleanup;
- Exterior fireproofing removals;
- Scaffold tie-ins, hoist tie-in installation, and crane tie-ins;
- Preliminary roof cleaning to establish a clean area for construction of a personnel decon on the roof for the balance of roof cleaning and for access/egress to the uppermost Work Area Grouping and roof transite and roof caulking removals;
- Establishing and releasing cleaned areas within the contaminated Building areas utilizing interior negative pressure tent enclosures;
- Creating waste decon access openings.

A large project personnel decon, remote from the work area, but otherwise in compliance with the provisions of ICR 56-9, shall be utilized. The large project personnel decontamination enclosure system shall be fully framed and sheathed.

Personnel shall don appropriate personal protective equipment ("PPE") in the remote decon.

Personnel Entrance and Decontamination Procedures for Removal Operations utilizing Remote Decontamination Enclosure System

The following entry/exit procedures shall be used for remote removal work areas.

1. All individuals who enter the work area shall legibly sign the entry/exit log located in the clean room upon each entry and exit. The log shall be permanently bound and shall identify fully the facility, agents, contractor(s), the project, each

work area and worker respiratory protection employed. The job supervisor shall be responsible for the maintenance of the log during the abatement activity.

2. Each worker shall remove street clothes in the clean room; wear two disposable suits, including gloves, hoods and non-skid footwear and put on a clean respirator (with new filters) before entering the work area. Respiratory protection requirements are detailed in Section 5 of the Deconstruction Plan ("Health and Safety Plan for the Deconstruction of the 130 Liberty Street Building").

3. Personnel utilizing the remote decon, before leaving the work area shall clean the outside of their respirators and remove outer protective clothing. In the air-lock to the work area, the inner suit shall be cleaned by wet cleaning and/or HEPA-vacuuming. The worker shall don a clean outer suit and then proceed to the designated internal elevator for transport to the decon. The respirator shall be removed and rinsed in the shower.
4. Following showering and drying off, each worker or authorized visitor shall proceed directly to the clean room, dress in street clothes and exit the decon immediately. Personnel shall sign out of the log book.

ATTACHED PERSONNEL DECONTAMINATION ENCLOSURE SYSTEM

Abatement is proposed to be conducted within a series of consecutive floors ("Work Area Grouping") concurrently. A decontamination unit ("decon") will be installed on the "cleared" floor immediately above the active Work Area Grouping and will be attached to the Work Area Grouping. Non-contaminated make-up air will be drawn from (a) cleaned vertical shafts and (b) through the attached decon from building areas, which have been previously cleaned and released, which exist outside the personnel decon and above the active Work Area Grouping. The top floor of the Building will be addressed using a remote decon as previously discussed.

<u>Personnel Entrance and Decontamination Procedures for Removal Operations Utilizing Attached Decontamination Enclosure System</u>

Entrance/egress from the active Work Area Grouping shall be through an attached decon located on the first clean floor above the active Work Area Grouping. The top floor of the Building will be addressed as previously discussed. The following entry/exit procedures shall be used for removal using attached decon:

1. All workers and authorized visitors shall enter the Work Area Grouping through the worker decon.

2. All individuals who enter the Work Area Grouping shall sign the entry log, located in the clean room, upon each entry and exit. The log shall be permanently bound and shall identify fully the facility, agents, contractor(s), the project, each Work Area Grouping and worker respiratory protection employed. The site supervisor shall be responsible for the maintenance of the log during the abatement activity.

Each worker or authorized visitor shall, upon entering the job site, remove street clothes in the clean room and put on a clean respirator (with new filters, if appropriate) and clean protective clothing before entering the Work Area Grouping through the shower room and equipment room.

4. Each worker or authorized visitor shall, each time he leaves the Work Area Grouping: remove gross contamination from clothing before leaving the Work Area Grouping; proceed to the equipment room and remove all clothing except the respirator; still wearing the respirator, proceed to the shower room; clean the outside of the respirator with soap and water while showering; for half-face respirators remove filters, wet them, and dispose of them in the container provided for that purpose; wash and rinse the inside of the respirator; and thoroughly shampoo and wash himself/herself.

5. Following showering and drying off, each worker or authorized visitor shall proceed directly to the clean room, dress in street clothes, and exit the decon immediately.

Clearance air monitoring may be performed on individual floors within the active Work Area Grouping as follows. The floor(s) to be cleared individually will be isolated from the balance of the Work Area Grouping at the completion of gross removal and gross clean-up within the floor(s) to be cleared. Airlock(s) with a minimum dimension of 3'x 3' will be constructed at (a) the entrance to the clean vertical shaft on the isolated floor(s) and (b) at the entrance to the isolated floor(s) from the balance of the Work Area Grouping. Personnel proceeding to the isolated floor in the final cleaning stage shall don two suits within the personnel decon, and shall then remove their outer suit prior to entering the airlock at the entrance to the isolated work area that is in the final cleaning stage. Upon achieving satisfactory clearance air sampling results, the cleared floor shall be isolated from the balance of the Work Area Group.

2.02 ESTABLISHING WASTE DECONTAMINATION ENCLOSURE SYSTEM

All ACBM and asbestos contaminated waste will be appropriately bagged/containerized within the regulated abatement work area and attached waste decontamination enclosure system ("waste decon"). A waste decon enclosure system may be constructed within the negative pressure work area at the exit from the contained area. The waste re-packaging area shall be fully framed and the interior floor, wall and ceiling surfaces shall be lined with two layers of 6-mil reinforced fire-retardant poly.

The interior and exterior entrance to the waste re-packaging area shall be of sufficient size to accommodate large metal components, to permit safe entry and exit of heavy equipment and shall contain "flaps" or a curtain drape to assist in maintaining negative pressure within the waste re-packaging area.

All removed ACBM must be packaged at the time of removal. No removed ACBM or asbestos waste will remain unpackaged at the end of the work day.

The floor surface in the waste process area shall be banked on the sides to confine contaminated waste water. Waste water shall be drained, collected and filtered through a system with at least 5 micron particle size collection capability. A system containing a series of several filters with progressively smaller pore sizes shall be used to avoid rapid clogging of the filtration system by large particles. Filtered wastewater shall be discharged in conformance with applicable codes. Contaminated filters shall be disposed of as asbestos waste (at a minimum).

Non-porous materials may be decontaminated utilizing wet methods (a pressure wash system may be used). Removal of non-porous, movable salvage shall be performed in compliance with 56-8.2(a).

Any non-porous, sealed Gaylord type boxes, loaded with asbestos waste, will be placed on pallets and passed through the waste decon via a pallet jack where they will be wet wiped and HEPA vacuumed. Upon completion of the waste decontamination procedures, the interior of the waste re-packaging area shall be wet cleaned. All standing water shall be removed by HEPA vacuuming or mopping the area.

One or more contaminated interior vertical shafts may be maintained to provide for transport of (a) containerized waste from the active abatement area to the waste re-packaging area and/or (b) properly packaged waste to the waste decon for final packaging prior to transport from site. The contaminated interior shafts will be isolated from any floor within the active Work Area Grouping where gross removal and gross cleaning has been completed. The contaminated interior vertical shaft shall remain isolated from all cleaned areas and non-active abatement areas. A curtained doorway shall be constructed at the lowest point of egress from the interior contaminated vertical shaft. Additional requirements for the use of contaminated interior shafts for the transport of wastes are described below in Subsection 2.11.

2.03 INSTALLATION OF ISOLATION BARRIERS

Isolation barriers conforming to the requirements of ICR 56-8.1(j) shall be constructed following pre-cleaning of isolation barrier surfaces. The Building exterior is constructed of fixed pane windows and sealed spandrel panels. Where intact, the Building exterior construction will form part of the isolation barriers. Missing windows or sections of curtain wall will be sealed using rigid sheathing, caulk and tape in compliance with ICR 56-8.1(k)(1) and ICR 56-8.1(k)(2), adhering to requirements approved by a New York State Licensed Professional Engineer. The interior surface of the rigid sheathing will be covered with two layers of fire retardant polyethylene (“poly”) of 6-mil (1 mil = 0.001 inches) in thickness and sealed with tape. Exterior louvers associated with mechanical room fresh air intakes will be sealed from the Building interior using two layers of 6-mil poly and tape.

Additional required isolation barriers shall consist of two layers of 6-mil fire retardant poly sealed individually with tape. All openings and penetrations to the exterior of the work area shall be sealed in accordance with ICR 56-8.1(j) and 8.1 (k) Items 1-4. Small penetrations around piping, conduit, etc., may be sealed with expandable foam. Floor drains shall be covered with two layers of 6-mil poly.

2.04 ESTABLISHING A NEGATIVE PRESSURE CONTAINMENT

No demolition or abatement shall occur within a negative pressure work area until area preparations and isolation barrier pre-cleaning activities as previously defined are completed.

Each floor in the work area is approximately 35,000 square feet with an average ceiling height of 13 feet. More than 20 operating HEPA-filtered negative ventilation units will be required to maintain the required air change rates on each floor.

Negative ventilation unit exhausts shall be placed into groups not to exceed five units. One extra group of five HEPA-filtered negative ventilation units shall be installed per work area as a back-up to maintain the minimum required air changes per hour should a primary bank of five (5) units be taken out of service during required shutdowns. If an elevated exhaust air sample is obtained, the bank of 5 units with the elevated result will be shut down, the units and filters inspected, repaired/changed out as necessary, and then put back into service. Each of those five units will be sampled independently for a minimum of three days to ascertain if any problems still exist. Upon receipt of additional elevated air sample results, the affected unit(s) will be taken out of service and removed from the work area for appropriate repair.

Negative ventilation exhausts will be installed to ensure the minimum distance of fifty (50) feet is maintained from air intake receptors in adjacent buildings, tunnels and subway HVAC system intakes. Sufficient HEPA ventilation units shall be installed to maintain at least four (4) air changes per hour during abatement and clean up activities.

HEPA ventilation exhaust will be installed within exterior building openings, where practical. In areas where there are no exterior building openings available, ventilation exhaust will occur at existing window locations. To facilitate those exhausts points, the following procedure will be utilized:

- The window pane will be secured from the interior and cut along the interior framing.
- The window will be angled and brought into the work area and either cleaned of settled dust or disposed of as an asbestos waste.
- The interior frame area will be cleaned using wet methods and HEPA vacuums. A rigid barrier with cutouts to accommodate up to five negative air exhaust flex hoses will be inserted into the opening of the interior frame area and all seams shall be sealed using caulk or foam. Flex hose penetrations shall be sealed airtight using caulk, foam or 6-mil poly and tape, as needed.

ACBM window pane caulk was not identified during conduct of the ICR 56-1.9/EPA NESHAPS Pre-demolition asbestos survey conducted at the site. Removal of window panes will not impact ACBM aluminum panel caulking. It is therefore anticipated that disturbance of ACBM caulk will be avoided or minimized, to the extent practical, prior to installation of negative ventilation units. Window removal and manifold installation will occur prior to any other preparation or potential asbestos disturbance, including debris removal within work areas. Pre-cleaning of window removal locations will occur prior to manifold installation activities. Visible gross debris, existing on interior and exterior window surfaces that will be impacted by installation of negative ventilation units/manifolds will be wetted and placed directly into a disposal container.

All impacted window surfaces will be HEPA vacuumed and/or wet-wiped prior to disturbance. Work area preparation and cleanup of gross debris will commence upon completing installation of negative ventilation equipment. No dry removal or disturbance of asbestos shall be permitted.

Exhaust duct hose will be installed and maintained in the work area to avoid damage to the extent possible and shall be inspected on a daily basis to ensure no damage has occurred. Any damage noted shall require the immediate shut down of that negative air machine to allow for repair or, if repair is not possible, the length of exhaust duct shall be replaced prior to placing the unit back into service.

Air outlets from the work area shall be at or near floor level. Power tools used to drill, cut into or otherwise disturb asbestos material, including settled dust or materials impacted by settled dust, shall be manufacturer equipped with HEPA filtered local exhaust ventilation.

Non-Contaminated Make-Up Air Source For All Work Areas

Non-contaminated make-up air will be drawn from cleaned vertical shafts and areas which have been previously cleaned and released which exist above the active work area, and/or through the waste decon with direct access to the exterior of the building. Supplementary non-contaminated make-up air, if required, will be provided using temporary "duct runs" or HEPA filtered make-up air vestibules from either cleaned areas or exterior sources.

2.05 PRE-CLEANING

Pre-cleaning shall consist of cleaning of surfaces over which isolation barriers will be installed. Loose material on exposed surfaces over which isolation barriers and negative pressure ventilation exhaust duct manifolds will be installed shall be wetted thoroughly with amended water prior to disturbance and/or HEPA vacuumed. Methods that raise dust, such as dry sweeping or vacuuming with equipment not equipped with HEPA filters, shall be prohibited.

Upon completing the above, large pieces of debris (e.g., building components, building materials) on the floor that may inhibit the installation of isolation barriers, the negative pressure system equipment or the movement of personnel on a floor will be removed and either containerized for proper disposal or, if non-porous material, may be staged for cleaning and salvage during subsequent Phase I abatement activities.

HEPA vacuuming or wet wiping of surfaces throughout the enclosed work area to clean dust, to remove debris that inhibited installation of isolation barriers and ventilation equipment as described above, and the removal of installed building components/materials will be performed within a HEPA-filtered negative pressure enclosure during subsequent Phase I abatement activities.

2.06 ESTABLISHING WORK AREAS

Each floor may be segregated into one or more negative pressure work areas. Abatement is proposed to be conducted within a series of consecutive floors ("Work Area Grouping") concurrently. Work areas within or between floors may be segregated by constructing an isolation barrier consisting of two layers of at least 6-mil poly within existing structural openings (e.g., doorways, corridors).

All openings and penetrations to the exterior of the work area shall be sealed in accordance with ICR 56-8.1(j) and ICR 56-8.1 (k1-k4), as applicable. Small penetrations around piping, conduit, etc, may be sealed with expandable foam. Floor drains shall be covered with two layers of 6-mil poly.

Prior to the start of abatement activities, the contained work area shall be inspected to ensure that it is free of any penetrations to outside the work area and is a closed system. Should any penetrations be found, they shall be properly sealed. Smoke testing of barriers and enclosure systems will be performed in conformance with ICR 56-11.1(e).

If during the removal operations a penetration is found, work in that work area shall stop immediately and the penetration shall be properly sealed.

2.07 ESTABLISHING AND RELEASING A CLEANED AREA WITHIN THE CONTAMINATED BUILDING AREAS UTILIZING INTERIOR NEGATIVE PRESSURE TENT ENCLOSURES

Interior Negative Pressure Tent Enclosures will be utilized to clean and release contaminated areas within the Building that cannot otherwise be included in the Interior Negative Pressurized Containment on a floor due to sequencing requirements. Procedures for establishing, cleaning, clearing and maintaining Negative Pressure Tent Enclosures are described below.

1. As the Negative Pressure Tent Enclosure will be installed within a contaminated area of the building, a Remote Personnel Decontamination Enclosure System, otherwise consistent with the requirements of ICR 56-9, shall be utilized.
2. If at any time a worker has to pass through an uncontaminated area to access the remote decon unit or the next work area, the worker wearing two suits of PPE shall remove one suit while in the airlock, wet wipe and HEPA vacuum exterior surfaces of the respirator and the inner suit, don a clean outer suit and proceed either to the next work area or the decon unit.
3. Negative Pressure Tent Enclosures shall be constructed and used per the 05-0427 Variance Decision dated May 11, 2005 including but not limited to two layers of six-mil fire-retardant polysheeting and shall include walls, ceiling and a floor (except for portions of floors, walls and ceilings that are removal surfaces) with double-folded seams. Interior tent areas will be constructed with an attached 3'x 3' airlock. Make-up air shall be provided to the airlock through HEPA-filtered interior air sources.
4. Personnel exiting the Negative Pressure Tent Enclosure shall proceed through the contaminated portion of the building to the remote personnel decon.
5. Once tent enclosure work area preparation has been completed and abatement activities commence, on a daily basis and per work-shift, one air sample shall be collected within

the tent enclosure entrance/exit. No other air samples associated with this work will be collected during the work exterior to the tent in the contaminated portions of the Building.

6. Clearance air sampling inside the tent, per 05-0427 Variance Decision, will be conducted under static pressure conditions. No other clearance air samples associated with this work will be collected during the work exterior to the tent in the contaminated portions of the Building. Upon completion of clearance air sampling, the tent shall be sealed airtight.
7. Upon receipt of successful clearance air sampling results, the tent enclosure will be maintained under a slight positive pressure utilizing HEPA-filtered supplied air to maintain its clean condition. Personnel entering the interior tent enclosures from a contaminated area shall proceed as follows:

   Upon entering the attached airlock, personnel shall remove the outer layer of protective clothing.

   The exterior surface of the respirator shall be wet-wiped or HEPA vacuumed.
8. The opening to the exterior (if required) can then be established within the tent.
9. Once work is complete in the tent, isolation of the opening to the exterior shall be maintained by installation of isolation barriers or decon chamber.

Hoist/Scaffold Tie-Ins

Tie-ins for the erection of any scaffold and hoist shall be performed by New York City Department of Environmental Protection ("NYCDEP") and New York State Department of Labor ("NYSDOL") asbestos certified handlers in a controlled manner as described below:

Tie-ins requiring Glass Panel Removal

For tie-ins requiring the removal of sections of the curtain wall glass, the following procedures shall be required:

1. Existing exterior netting shall be removed following the procedures described herein.
2. The exterior of the glass to be removed to facilitate installation of tie-ins shall be cleaned per NYCDEP protocols as defined in the NYSDOL Variance Decision File No. 05-0427.
3. Prior to removal of glass, the interior tie-in attachment points shall be enclosed within an Interior Negative Pressure Tent Enclosure attached to the glass to be removed as described above. The Negative Pressure Tent Enclosure shall be large enough to accommodate workers, equipment, glass and material removal and cleaning operations. All items within the tent shall be properly removed and surfaces cleaned. Each Negative Pressure Tent Enclosure shall be cleaned and cleared, including passing a visual inspection and clearance air sampling prior to creating the opening to the exterior.
4. Once the necessary tie-in connections are prepared, the opening to the exterior can be established and final connections made for the erection of the hoist or scaffold.
5. The abatement contractor shall then immediately seal the exterior opening with a rigid barrier covered by two layers of six-mil polyethylene sheeting with appropriate supports to ensure the barrier will remain in place until the completion of Phase I Deconstruction activities on the floor.

Tie-ins requiring Aluminum Panel Removal

For tie-ins requiring the removal of sections of the curtain wall aluminum panels, the following

procedures shall be required:

1. Existing exterior netting shall be removed following the procedures described herein.
2. The exterior of the aluminum panels to be removed to facilitate installation of tie-ins shall be cleaned per NYCDEP protocols as defined in the NYSDOL Variance Decision File No. 05-0427.
3. Prior to removal of aluminum panels, the interior tie-in attachment points shall be enclosed within an Interior Negative Pressure Tent Enclosure attached to the aluminum panels to be removed as described above. In addition, a Negative Pressure Tent Enclosure shall be constructed on a scaffold exterior to the building to enclose the aluminum panels to be removed. (Note a pilot study is to be proposed to attempt to establish possible procedures in lieu of exterior enclosures for this work.) The Negative Pressure Tent Enclosure shall be large enough to accommodate workers, equipment, aluminum panels and material removal and cleaning operations. All items within the tent shall be properly removed and surfaces cleaned. Each Negative Pressure Tent Enclosure shall be cleaned and cleared, including passing a visual inspection and clearance air sampling prior to creating the opening to the exterior. Each exterior exterior tent enclosure shall be constructed and negative air established prior to commencement of necessary removals. Once removals are complete, cleaning of surfaces followed by a satisfactory visual inspection by the project monitor shall be completed prior to commencement of clearance air sampling.
4. Once the necessary tie-in connections are prepared, the opening to the exterior can be established and final connections made for the erection of the hoist or scaffold.
5. Prior to removal of tent enclosures, the abatement contractor shall then immediately seal the exterior opening with a rigid barrier covered by two layers of six-mil polyethylene sheeting with appropriate supports to ensure the barrier will remain in place until the completion of Phase I Deconstruction activities on the floor.

Tie-ins Requiring Small Penetrations through Curtain Wall

For tie-ins requiring small (less than six inch diameter) penetrations of the curtain wall utilizing manufacturer equipped HEPA-shrouded drilling/cutting equipment, the following procedures shall be required:

1. Access to the active work area on the scaffold will be restricted. The work area on the scaffold shall be cordoned off with barrier tape.
2. Only NYSDOL and NYCDEP certified asbestos workers shall be permitted within the work area.
3. The exterior of the impacted section of curtain wall to facilitate installation of tie-ins shall be cleaned per NYCDEP protocols as defined in the NYSDOL Variance Decision File No. 05-0427.
4. Drilling or cutting through asbestos-containing caulk on sections of aluminum column covers and fascia is not permitted unless work is performed within an exterior Negative Pressure Tent Enclosure. (Note a pilot study is to be proposed to attempt to obtain regulatory relief from the requirement for exterior enclosures for this work.)
5. Drilling or cutting through the curtain wall to create a small penetration for installation of tie-ins shall be accomplished with manufacturer-equipped HEPA filtered and shrouded drilling/cutting equipment utilizing wet methods.

6. Polyethylene sheet or rubber mat shall be installed under the work area prior to the start of work. Upon completion of creating a small access point in curtain wall, a connecting rod shall be inserted within the penetration, the penetration sealed and the area HEPA vacuumed and/or wet-wiped.
7. Interior installation of the tie-ins shall occur within the Building by properly certified NYSDOL and NYCDEP asbestos workers.

2.08 MOVEMENT OF PERSONNEL

With the exception of the first grouping of work areas on the upper floors and where remote decons are allowed, as previously described, abatement personnel will enter the active abatement areas from the attached personnel decon established on the cleaned floor(s) above. Transport of workers will be through the use of an exterior hoist or cleaned interior vertical shaft. Abatement personnel will enter the personnel decon and shall don PPE prior to entering work area.

Access between floors within the active abatement area will be primarily through interior stairwells which have not been cleaned. Work area egress shall be as described below in the section entitled, "Sequencing of asbestos project work within shafts and stairwells".

With the exception of Specialty Trade personnel involved in abatement project support activities, non-certified worker access to non-asbestos project areas above the floors still subject to abatement and cleaning will be primarily by use of an exterior hoist(s) or stair tower(s) through established exterior access openings. Construction of tunnels within cleaned stairwell(s) may also be utilized for interior access.

Sequencing of Asbestos Project Work Within Shafts And Stairwells (Interior Vertical Shafts)

The current Phase I approach provides for conducting a wall to wall gut on each floor within the active work area. CMU walls are limited to 1) building core stairwells, elevators, MEP shafts (vertical shafts) between Cellar B and the 3rd Floor, 2) some limited walls at the 39th floor and above and 3) minor continuous vertical utility shafts (three).

The balance of vertical shaft walls are constructed with a 1" gypsum core board on the interior side and two layers of 5/8" sheetrock on the exterior (tenant) side. One or more interior vertical shafts will be maintained for use by abatement personnel during the project as described below.

Clean Interior Shafts

One or more interior vertical shafts may be maintained to provide "clean" make up air for clearance air monitoring of individual floors and movement of clean personnel and equipment during the project. The vertical shaft to be cleaned will be isolated from adjacent contaminated spaces. The interior surfaces and equipment of the "clean" vertical shaft shall be thoroughly HEPA vacuumed and wet-wiped prior to conducting aggressive TEM clearance air sampling. Clean make-up air will be provided from non-contaminated areas above or below the vertical shaft, as practicable.

Upon successful completion of clearance air sampling, the cleaned vertical shafts will be isolated from contaminated areas prior to and during active abatement and gross cleaning on each floor. At the completion of removal and gross clean-up, an airlock(s) with a minimum dimension of 3'x3' will be constructed at the work area(s) entrance to the clean vertical shaft. Make-up air during the final clean-up stage and for clearance air monitoring for each isolated work area will be provided from the clean vertical shaft. Access/egress for abatement personnel through clean vertical shafts shall be limited to those areas where satisfactory clearance air monitoring results have been achieved.

Only properly packaged and labeled waste or personnel moving between clean areas shall be transported within clean vertical shafts. Use of cleaned vertical shafts by abatement personnel shall be limited to access between clean areas only. Bulk waste material containers shall not be transported through these cleaned vertical shafts.

Waste Movement via Contaminated Interior Shafts is described in Subsection 2.11 Movement of Material and Waste.

Disassembly of Clean and Contaminated Interior Vertical Shafts is described in 2.10 Work Procedures.

2.09 SEQUENCE OF WORK

Negative air systems and isolation barriers will be completed prior to bulk debris removal. All interior non-structural building materials will be removed under negative pressure during either Preparation Phase or Phase I abatement activities. The project involves concurrent decontamination of non-porous Building and equipment surfaces, disposal of building materials contaminated with settled dust and debris, and removal of ACBM from within the same negative pressure work area. Installed ACBM, located above or behind contaminated building materials, will be exposed during interior demolition to permit removal of this material inside of the existing negative pressure work area. All remaining non-porous interior surfaces/equipment shall be cleaned as part of the post-abatement cleaning process prior to clearance air sampling.

Building materials will be removed using the following general sequencing within each designated work area, as applicable. Removal of multiple types of ACM[4] within a single containment shall follow the sequential order from the ceiling down and or from the most friable to least friable in each active abatement area per the Variance Decision File No. 05-0427. Multiple active abatement areas may exist simultaneously within a single containment, however individual active abatement areas shall be separated by a minimum distance of fifty (50) feet

[4] When used herein, "ACM" means asbestos (friable or non-friable), asbestos material (friable or non-friable), asbestos-containing material (friable or non-friable), and/or asbestos waste (friable or non-friable), including but not limited to (i) building materials containing asbestos which were present in the Building prior to September 11, 2001, and (ii) any and all materials impacted by asbestos (solely excluding non-porous items impacted by asbestos if and only if said non-porous items have previously been properly cleaned and released in accordance with all Legal Requirements to the satisfaction of all of the applicable federal, state, and local Governmental Authorities). The Government Authorities have stated that (a) WTC dust and debris and (b) all materials impacted by WTC dust and debris must be treated as asbestos material and disposed of as asbestos waste and, accordingly, all of these materials are included in the definition of ACM herein.

(approximately equal to distance between two (2) columns).

Transite panels serving as louver blanks will be removed manually as part of the isolation barrier installation process. Localized negative exhaust will be used during the removal process.

Transite panels will be removed intact, to the extent feasible. As transite panels are removed, louvers will be HEPA vacuumed and/or wet-wiped and isolation barriers installed. At no time will greater than 64 square feet be open at any one time prior to installation of isolation barriers.

For mechanical work floor areas with removal of exterior wall transite panels, a minimum of 6 air changes per hour must be maintained, and a maximum opening of 64 sq. ft. is allowed at any one time during transite panel intact removal. No other ACM or WTC dust/residue disturbance is allowed during exterior wall transite panel removal and hardwall isolation barrier installation. In addition, for these mechanical floor work areas a manometer shall be used to document a minimum of –0.02 column inches of water pressure differential, relative to pressure outside the regulated abatement area. Once installed, on an hourly basis per workshift, the asbestos abatement contractor's supervisor shall document the manometer reading within the daily project log.

2.10 WORK PROCEDURES

1. Materials containing asbestos or contaminated by dust shall be wetted frequently with amended water. No dry removal or disturbance of asbestos shall be permitted.

2. Sufficient time shall be allowed for penetration to occur prior to abatement activities. All friable asbestos shall be saturated. All non-hygroscopic asbestos shall be maintained thoroughly wetted.

3. The lowest elevation within each active work area shall be rendered water tight. Clean-up of waste water shall be on-going during pressure washing. Absorbent materials and/or plasticizing will be utilized within the containment, as required, to control water during cleaning activities. Waste water will be contained within the active work area during pressure washing activities. A pressure washer may be used to assist in detail work area cleaning.

4. Asbestos materials and asbestos-contaminated materials on detachment from the substrate shall be directly bagged/containerized.

5. Floor tile and mastic will be removed via the following work practices:
   - Floor tiles and mastic shall be periodically misted with amended water prior to, during and subsequent to removal.
   - Floor tiles will be removed using manual methods only, to the extent practical.
   - Floor tiles shall be directly containerized for disposal.
   - Chemical mastic remover using manual methods and or a mechanical buffer may be used to remove gross residual mastic from areas.
   - Concrete staining or discoloration caused by absorption of liquefied petroleum based mastics will be visually inspected to verify that all residual mastic has been removed

from the concrete substrate. Upon verification that residual mastic has been removed, concrete staining or discoloration may remain.

6. ACBM pipe insulation shall be removed within an existing negative pressure work area and will be removed either using glovebags or a "wrap & cut" procedure with glovebag removals at cut locations. The abated area of the pipe to be cut need not be plasticized. Pipe sections to be removed with the ACBM insulation intact shall be wrapped with two layers of 6-mil poly and sealed with tape. A label shall be placed on each length of pipe. Pipe shall be adequately supported prior to cutting and shall be cut only on abated or clean surfaces.

7. SOFP shall be removed within an existing negative pressure containment as follows:
   - The floor within the active SOFP removal area shall be covered utilizing a single layer 6-mil poly drop cloth extending beyond the active SOFP removal area by at least ten feet in every direction;
   - If a pressure wash system is used for final cleaning, waste water will be collected, filtered through a system with at least 5.0 micron particle size capability prior to discharge in accordance with all applicable regulations.

8. Duct and raceways will be cleaned, inspected and cleared as follows:

   General Information

   Raceways run in an East/West direction. With the exception of Core Building shaft areas, the Raceways run beneath the floor slab and span the entire length of the building (approximately 182 feet)). The structural column rows are separated by a horizontal distance of approximately twenty-five feet. Typically, there are six (6) raceways between each set of structural columns.

   The Walker Ducts run in a North/South direction. The Walker Ducts are imbedded within the concrete floor slab, interconnect individual Raceways and typically do not span the entire length of the building. The Electrical Plan Drawing (Typical) for the 31st Floor is attached for reference.

   Cleaning, Visual Inspection and Clearance of Walker Ducts and Raceways

   It is the intent of this work to clean and remove all dirt, dust and debris from the raceway and walker ducts in the floor cabling system. If after video inspection and/or testing, it is determined that areas have not been thoroughly cleaned, those areas shall be re-cleaned by the contractor. Third party inspections will be conducted by the Owner's representative. This work will be done during the Asbestos Abatement Project under negative pressure.

   A. Work to be performed will include the following:

      - Removal of raceway/duct access plates, as necessary.
      - Removal of all wires and cables from the ducts/raceways

- Isolation of ducts, as required, to prevent cross contamination.
- Cleaning of all East to West Raceways (approx 2" x 6") on all floors.
- Cleaning of all Walker Ducts (1" x 4") on all floors.
- Cleaning of all terminal drops to floor ducts which are part of the systems.
- Removal of all dirt, dust, lint, etc., caused by cleaning process in areas affected by cleaning process.
- Representative photographs will be taken after cleaning.

B. Cleaning, Visual Inspection and Clearance Air Sampling will be performed as follows:

- Cleaning will be performed in accordance with the National Air Duct Cleaners Association Standards (NADCA) ACR 2005. All access will be through existing 6" floor openings.
- Negative air machine shall be attached to the duct system to obtain approximately 2,500 cubic feet per minute of air movement across the active duct work space.
- All areas will be air washed using Scand Tech USA High Volume Nozzles or equivalent.
- Air washing will be done using high volume, medium pressure Scand Tech USA Tornado Nozzles, or equivalent (see attached for example equipment). Maximum air pressure at nozzles should not exceed 125 psi with a minimum volume of 80 cubic feet per minute (CFM). Air movement must be of sufficient volume to prevent any cross contamination.
- High volume Tornado Nozzles will be used to move contaminants to the collectors. Use of tube style air whips will not be allowed unless they are capable of dispensing a minimum of 80 CFM of discharge air.
- Air Compressors will be Kaeser ASD 30 or equivalent. Air compressors must generate a minimum of 130 CFM at 125 PSI. Air compressors will use "Y Delta" connections to reduce start up amperage.
- HEPA Air Scrubbers up to 2000 CFM will be used for make up air entering the duct systems.
- Dislodged contaminants will be collected in a HEPA filtration system. All dirt, duct, lint and other accumulations will be removed by approved, HEPA filtered negative air machines (NADCA ACR 2002, 5.3.3) capable of removing a minimum of 4000 CFM of air from the duct system during the cleaning process.
- Following initial air washing, a visual inspection of the cleaned duct area will be performed. As the cleaning work progresses and prior to duct access plate closure, the cleaned duct work area shall be inspected.
- Video inspection equipment will be used to inspect cleaned duct areas (see attached example equipment). The camera lens will be capable of focusing to 1" from surfaces. Inspection equipment will be capable of inspecting ducts of a minimum 1" x 4" dimension up to an approximate distance of 20 meters from one access port.
- All inspected areas will be identified and representative photographs taken.
- If debris or residue is still observed during the visual inspection, brushing shall be required. If necessary, a variety of brushes and mechanical agitators may be used to dislodge contaminants. If brushing is required, brush cables must be capable of reaching up to 30 meters from one opening. Brushes must be sized specifically for

each duct size; Scand Tech USA brushes or equivalent. If brushing is required, whip brushes must be used on all square or rectangular ducts.

- Upon successful completion of the visual inspection, aggressive air sampling within the work area shall be performed as described in Variance Decision File No. 05-0427. Prior commencement of this clearance air sampling, all Walker Duct/Raceway floor opening access ports shall be opened to the work area and leaf blower directed into access port openings.

C. Grouping and Isolation Procedures

A maximum of eight Raceways with their associated Walker Ducts will be cleaned within a single grouping. The actual number of Raceways included within a single grouping will be based on the requirement to maintain a minimum air movement of 1,000 linear feet per minute.

The Raceways and Walker Ducts within a defined grouping will be isolated from the adjacent Raceway by installation of isolation points, within the Walker Ducts, where these systems interconnect.

- Each Raceway and Walker Duct grouping will be cleaned for the entire East to West length by accessing through several existing floor openings.

- Raceway and Walker Duct cleaning, within each negative pressure work area, will generally proceed from the outside edge of each negative pressure work area (i.e., the Borth and/or South end of the Building) working back towards the opposite end.

- The connecting openings in the Walker Ducts, on the perimeter of the defined grouping, will be accessed through the existing floor openings and cleaned using HEPA vacuums.

- Isolation Points, to segregate the grouping to be cleaned from the rest of the system, will be installed by using expandable foam in each of the cleaned perimeter Walker Duct openings.

- Each defined grouping shall be placed under negative pressure by installation of High Volume HEPA Air Scrubbers; as described in the previous submittal, HEPA filtered supply air shall be provided at the Supply End of the isolated grouping and a HEPA Filtered Collection Unit shall be installed at the Collection end. This will provide air movement within the isolated grouping of at least 1,000 linear feet per minute.

- Reverse Air Tornado nozzles, described in the previous submittal, will be inserted through the access opening downstream of the section to be cleaned. Maximum length of air hose to be inserted for cleaning shall be approximately sixty-five (65) feet.

- The cleaning shall proceed from the Supply End towards the Collection End of the

isolated Raceway/Walker Duct grouping. This process will be repeated until cleaning is complete by incrementally moving toward the HEPA negative air collector.

9. Large non-porous unventilated equipment that cannot be moved manually may be cleaned in place and left uncovered during clearance air monitoring. This equipment will be removed as clean material after the completion of successful clearance air monitoring for the floor containing the equipment.

10. Large non-porous ventilated equipment that cannot be internally cleaned or moved manually may be (i) packaged in a double lined hardwall container, properly labeled as asbestos contaminated waste, and staged for removal by mechanical means after the completion of the abatement phase; or (ii) mechanically cut, as needed, to reduce the size of these components for handling and/or complete decontamination.

11. Porous demolition debris and porous material within the work area shall be disposed of as asbestos waste.

12. Non-porous salvage items may be (i) disposed of as asbestos waste or (ii) decontaminated and released as specified in Industrial Code Rule 56-8.2.

13. An equipment decontamination area shall be cordoned off within the work site for cleaning heavy equipment, e.g. backhoes, excavators, loaders. The floor surface in this decontamination area shall be plasticized and banked on the side to confine the contaminated wastewater.
    Equipment shall be washed with water after which all exposed surfaces of the equipment shall be manually wet wiped. Upon completion of the decontamination procedures, the interior of the equipment decontamination area shall be wet wiped.
    The floor surface below the equipment decontamination area shall be cleaned and any residual asbestos contamination shall be removed and disposed of as asbestos-contaminated waste.
    Wastewater shall be confined within the equipment wash area and shall be collected and filtered through a system with at least 5.0 micron particle size capability prior to discharge.

The following identify specific additional work procedures to be followed:

Exterior Gash Area General Sequence:

1. Area preparation consisting of the installation of a caulked, sealed barrier with rigid sheathing covered with two layers of fire retardant 6-mil poly on the Building interior side in compliance with ICR 56-8.1(k)(1) and ICR 56-8.1(k)(2), adhering to requirements approved by a New York State Licensed Professional Engineer. This barrier shall enclose the opening in the exterior façade;
2. Installation of HEPA ventilation equipment as required;
3. Demolition of the existing wall separating the gash area from the remaining floor space in order to access the ACBM wall/floor joint tar paper existing at its base;

4. Cleaning of walker ducts/raceways in these areas will be done in conjunction with cleaning of these systems in the adjacent interior containment;
5. Detail cleaning of work area; and
6. Clearance air monitoring shall be performed at the completion of all work within each negative pressure work area.

Netting Removal

1. Existing building netting shall be removed as scaffold is erected.
2. Access to the active work area on the scaffold will be restricted. The work area on the scaffold shall be cordoned off with barrier tape.
3. Only NYSDOL and NYCDEP certified asbestos workers shall be permitted within the work area. The vacating of each work area and warning signs shall comply with ICR 56-8.1(b).
4. One layer of poly or rubber mat shall be installed on the scaffold work area floor.
5. Once the scaffold is prepared, the netting will be misted with an amended water solution prior to cutting and/or HEPA vacuumed (depending upon dust concentrations), then cut under wet conditions into manageable sections.
6. Removed netting will be properly bagged or wrapped in two (2) layers of poly in preparation for transportation and disposal as asbestos waste.
7. Once netting is removed, the exposed cables and tiebacks will be wet wiped, and thereafter may be removed as clean material. The cleaned cable or tiebacks may remain for removal during subsequent deconstruction.
8. If at any time a worker has to pass through an uncontaminated area to access the remote decon unit or the next work area, the worker shall don two suits of PPE, remove one suit while in the work area, wet wipe the inner suit, don a clean suit and proceed either to the next work area or the decon unit.

Exterior Negative Pressure Tent Enclosures

1. Exterior Negative Pressure Tent Enclosures shall be utilized, as required, to clean and release contaminated areas exterior to the Building. Exterior negative pressure tent enclosure work areas shall be utilized to remove exposed exterior spray-on fireproofing ("SOFP"). The quantity of SOFP removed within a single negative pressure tent should be limited to removal of a maximum of approximately one-hundred sixty (160) square feet. For removal of exposed exterior SOFP, construction of multiple enclosures shall be required to ensure the quantity within a single tent does not exceed one-hundred sixty (160) square feet. Procedures for establishing, cleaning, clearing and maintaining Exterior Negative Pressure Tent Enclosures are described below.
2. The Negative Pressure Tent Enclosure will be installed exterior to the building on a scaffold system. A Remote Personnel Decontamination Enclosure System, otherwise consistent with the requirements of ICR 56-9, shall be utilized.
3. If at any time a worker has to pass through an uncontaminated area to access the remote decon unit or the next work area, the worker wearing two suits of PPE shall remove one suit while in the work area, wet wipe the inner suit, don a clean outer suit and proceed either to the next work area or the decon unit.
4. Negative Pressure Tent Enclosures shall be constructed and used per the 05-0427 Variance Decision dated May 11, 2005 including but not limited to two (2) layers of six

mil fire-retardant polyethylene sheeting and shall include walls, ceiling and a floor (except for portions of floors walls and ceilings that are removal surfaces) with double-folded seams. Exterior tents will be constructed with an attached 3'x 3' airlock. Make-up air shall be provided from the exterior to the tent through the airlock.

5. Bulk removal of SOFP shall be performed using manual means (i.e., wet scraping) with local HEPA ventilation.
6. Upon completing the removal of SOFP, the surfaces from which SOFP have been removed and the interior surfaces of the tent will be thoroughly HEPA vacuumed and wet-wiped.
7. Personnel exiting the Negative Pressure Tent Enclosure shall proceed to the Remote Personnel Decontamination Enclosure System.
8. Once tent enclosure work area preparation has been completed and abatement activities commence, on a daily basis and per work-shift, one (1) air sample shall be collected within the tent enclosure entrance/exit and exterior to the tent as required.
9. Clearance air sampling will be conducted inside the tent, prior to tent removal.

Roof, Façade and General Exterior Area Clean-up

The roof, building façade and exterior areas requiring general clean-up will be cleaned in accord with NYCDEP WTC Dust/Residue Roof & Façade Cleaning procedures provided in the NYSDOL Variance Decision File No. 05-0427, dated May 11, 2005.

Disassembly of Clean and Contaminated Interior Vertical Shafts

Clean vertical shafts which are of CMU construction shall remain sealed from contaminated areas and may remain in place for demolition and disposal as clean material during Phase II deconstruction.

Vertical shafts (both clean and contaminated) which are not CMU, will not necessarily be removed as part of the wall to wall gut conducted on each floor and may be maintained intact for use during cleanup of subsequent Work Area Groupings. Such vertical shafts shall be disassembled as follows.

A negative pressure tent consisting of two layers of six-mil poly shall be constructed to enclose the area surrounding the section of the vertical shaft to be removed. The tent shall be sealed at the top and the bottom of the section of vertical interior shaft to be removed. The tent on each floor shall consist of four walls and a floor. The walls shall be attached directly to the underside of the metal ceiling deck. A minimum of an OSHA Class I 3-chamber decon shall be utilized. Barrier tape and signage shall be placed surrounding the negative pressure tent at a minimum distance of twenty-five (25) feet, where practicable. The interior of the negative pressure tent shall be considered the work area.

HEPA ventilation units shall be installed within the tent to maintain a minimum of six (6) air changes per hour. Clean make-up air shall be provided to the tent from clean areas adjacent to the tent which have been previously cleared as part of the wall to wall gut on the balance of each floor.

Waste generated during the vertical shaft disassembly shall be properly packaged in a leak-tight waste container within the tent. The exterior surface of the leak-tight waste container shall be

wet-wiped and appropriate waste bag/container decontamination procedures shall be utilized when transferring waste bags /containers through the attached decon.. Personnel in proper PPE who have not entered the work area shall enter and remain within the decon during bag-out. These personnel shall properly place and seal the containerized waste within a second leak-tight container, wet-wipe the exterior of the second container and place the properly packaged waste outside the decon for transfer to the waste trailer or waste repackaging area. Waste shall not be stored within the decon. Upon completing gross removal and disassembly of the entire length of vertical shaft wall being removed, the entire negative pressure work area shall be cleaned using HEPA vacuuming and wet-wiping. The exposed interior layer of poly in the negative pressure tent shall be lightly misted with encapsulant. Encapsulant shall not be applied to any surfaces which have been the subject of abatement. Upon completion of a minimum four-hour settling/drying period the interior of the tent shall be inspected. If all surfaces are verified to be clean and dry, aggressive clearance sampling may be performed. Upon satisfactory completion of aggressive clearance air sampling, the tent may be disassembled and disposed of as asbestos waste

Rooftop Cooling Tower Transite and Caulking Materials

1. The work area shall be cordoned off with barrier tape or line and shall be accessible through only one entrance/exit. The asbestos work area shall extend beyond the active abatement area to the roof edge or a maximum distance of twenty five (25) feet, whichever is less.

2. In areas where these distances are not attainable due to obstructions (equipment, structural components) an orange construction fence shall be erected at the furthest point achievable to demarcate the work area.

3. All openings (including, but not limited to windows, doors, ducts, and grilles) on the roof level within fifty (50) feet of the active abatement area shall be sealed with two (2) layers of at least six-mil poly.

4. The work area below the materials to be removed shall be plasticized using two layers of six-mil fire retardant poly. The poly shall extend outward from below the active abatement area at least ten (10) feet.

5. The area surrounding the cooling tower and roof top penthouse from which transite or caulking is to be removed shall be platicized using two (2) layers of at least six-mil poly. That poly shall extend outward on the surface of the rooftop from the perimeter of the structure for a distance of at least ten (10) feet.

6. Uncertified persons shall not be permitted within the work area. The vacating of each work area and warning signs shall comply with ICR 56-8.1(b).

7. The transite and caulking materials shall be removed using manual wet methods. HEPA filtered local exhaust ventilation shall be utilized, as required by Industrial Code Rule 56-7.1(j), whenever unfastening of intact ACM requires the use of power tools.

8. Precautions shall include, but not be limited to, the use of amended water to adequately wet the transite panels and the use of controlled methods to lower the panels. The transite panels

shall be transferred to a rooftop waste consolidation area for packaging prior to being lowered to ground level for placement into a transportation container. Properly packaged and labeled waste will be transferred from the ground level staging area to the transport container.

9. Caulking shall be wetted with amended water during removal and immediately placed in asbestos disposal bags of at least six-mil poly and sealed airtight.

10. Personal protective equipment as required by Industrial Code Rule 56-4.1(d) shall be provided and used by all personnel within the cordoned off work area.

11. A rooftop personnel decontamination enclosure system "remote" from the work area but otherwise compliant with Subpart 56-9, shall be utilized. The personnel decontamination enclosure shall be removed only after satisfactory clearance air monitoring results have been achieved.

12. The Contractor shall establish an equipment area adjacent to the regulated work area for the decontamination of equipment. This equipment area shall consist of an area covered with impermeable plastic sheeting (two (2) layers of six-mil poly, at a minimum) on the horizontal working surface. The equipment area shall be of sufficient size to accommodate cleaning of equipment without spreading visible accumulations of contamination beyond the equipment area boundaries.

13. Air sampling and analysis shall be conducted, in each work area, according to the requirements of Subpart 56-17. Two area samples will be taken within ten (10) feet of the work area boundary in an adjacent non work area, for each day and workshift in that area.

14. In addition to the requirements of Subpart 56-17, air monitoring of the entire work area shall be conducted when abatement activities are being conducted. If air sample results indicate any airborne asbestos fiber concentration(s) at or above 0.01 fibers per cubic centimeter, or the background level, whichever is greater, work shall be stopped immediately, methods shall be altered to reduce the airborne asbestos fiber concentrations(s) to the aforementioned level and work shall not resume until that level is attained.

15. If at any time a worker has to pass through an uncontaminated area to access a remote decontamination unit or the next work area, the worker shall don two suits of PPE, remove one suit while in the airlock (changing chamber), wet wipe the inner suit, don a clean suit and proceed either to the next work area or the decontamination unit.

Rooftop Non-Friable Exterior ACM Waste Packaging Consolidation Area

1. The Contractor shall establish a rooftop waste packaging consolidation area in close proximity to the regulated exterior work area for the preparation and packaging of non-friable waste for transportation and disposal. The rooftop waste packaging consolidation area shall consist of an area covered with an impermeable drop cloth (consisting of two (2) layers of six-mil poly, at a minimum) on the floor/deck or horizontal working surface.

2. The rooftop waste packaging consolidation area shall be of sufficient size to accommodate consolidation and packaging of waste.

3. The waste packaging consolidation area shall be enclosed with barrier tape at a minimum distance of twenty-five feet from the edge of the impermeable drop cloth or the roof edge, whichever is less.

Prior to being removed from the rooftop waste packaging consolidation area, all waste will be wrapped in two (2) layers of 6-mil poly, sealed leak tight.The exterior surface of the properly packaged waste shall be wet-wiped prior to removal from the rooftop waste packaging consolidation area. Properly packaged waste will be transported from the waste packaging consolidation area directly to the disposal container.

2.11 MOVEMENT OF MATERIALS/ WASTE

Waste Movement via Contaminated Interior Shafts

One or more contaminated interior vertical shafts may be maintained to provide for transport of (a) containerized waste from the active abatement area to the waste re-packaging area and/or (b) properly packaged waste to the waste decon for final packaging prior to transport from site. The contaminated interior shafts will be isolated from any floor within the active Work Area Grouping where gross removal and gross cleaning has been completed. The contaminated interior vertical shaft shall remain isolated from all cleaned areas and non-active abatement areas. A curtained doorway shall be constructed at the lowest point of egress from the interior contaminated vertical shaft. The curtained doorway shall be connected by a two (2) layer poly tunnel to the waste re-packaging area. A by-pass area for properly packaged and labeled asbestos waste may be installed within the waste re-packaging area leading directly to the waste decon attached to the waste re-packaging area. Bulk packaged material or waste not packaged for final disposal shall be brought through the tunnel into the waste re-packaging area for final packaging and labeling. The waste re-packaging area, tunnel and waste decon shall be maintained under negative pressure with a minimum of eight (8) air changes per hour during the entire abatement project. At the completion of all abatement activities, the curtained doorway shall be cleaned, all surfaces within the waste re-packaging area, tunnel and waste decon shall be thoroughly cleaned using HEPA vacuuming and wet-wiping. At the completion of the first cleaning a visual inspection shall be performed to verify the work area is clean. The exposed interior layer of poly within the negative pressure work area shall be lightly misted with encapsulant. Encapsulant shall not be applied to any surfaces which have been the subject of abatement. Upon completion of a minimum four-hour settling/drying period the interior of the work area shall be inspected. If all surfaces are verified to be clean and dry, aggressive clearance sampling may be performed. Upon satisfactory completion of aggressive clearance air sampling, the waste re-packaging area and tunnel may be disassembled and disposed of as asbestos waste. The curtained doorway shall be removed only when disassembly of the interior vertical shaft has been completed after successful air clearance sampling.

Waste Handling

It is anticipated that a high volume of asbestos waste, including ACBM, settled dust, and materials impacted by settled dust, will be generated during this project. Therefore, conventional

bagging of all asbestos waste on a project of this size would result in generation of very large waste volumes for handling and packaging, an increase in the number and/or size of trucks required for waste transportation, an increase of off-site burial volume, and require workers to hand process waste in a time- and labor-intensive manner. A variance from ICR 56 was requested to reduce the volume of asbestos waste trucked through Lower Manhattan, reduce the volume of waste to be placed in landfills, and minimize workers' direct handling and packaging of asbestos-contaminated waste.

Waste streams may be processed utilizing double lined bulk transfer containers with closing lids and transferred directly into double lined disposal containers using a dust-free inclined chute as described below. All such materials also will be handled and disposed of as asbestos wastes, at a minimum, in accordance with applicable federal, state and local laws.

Upon removal, ACBM and SOFP will be packaged into properly labeled leak-tight containers (e.g., bags, gaylord boxes, drums) for handling and disposal as asbestos wastes, at a minimum, in accordance with applicable federal, state and local laws.

The removal of large sheet metal sections and steel components will require use of heavy equipment to move and lower them to grade level. Moveable equipment remaining within the negative pressure work area will be either cleaned or removed during the abatement phase (Phase I) of the project. Fixed objects within the negative pressure work area will be either cleaned or removed during the abatement phase (Phase I) of the project.

The majority of the large sheet metal and steel components will be washed and decontaminated for release as clean salvage. Porous materials will be properly packaged for disposal as asbestos waste (at a minimum) and lowered to the ground using controlled methods (e.g., hoists).

Removal of non-porous, non-movable salvage shall be performed in compliance with 56-8.2(a).

Use of a Portable Bulk Shredder

The project may be performed using a portable bulk shredder for processing of the asbestos-contaminated waste in order to facilitate its transport to a waste re-packaging station. If a portable bulk shredder is utilized, it shall remain within the active negative pressure work area during use. A portable shredder may be utilized for processing of compatible building materials waste streams contaminated with settled dust such as, for example, wall board. ACBM will not be processed through the shredder.

If a portable shredder is utilized, upon removal from the substrate, waste materials shall be thoroughly wetted and placed into a portable bulk shredder. These materials shall be wetted while in the portable bulk shredder.

Waste processed through the portable bulk shredder shall be packaged into properly labeled leak tight containers for disposal as asbestos waste, at a minimum. All such materials will be treated and disposed of as asbestos wastes at a minimum. Local HEPA ventilation exhaust equipment shall be utilized to minimize and filter emissions from the portable bulk shredder system.

The feasibility of small portable shredders for use within the active abatement areas is currently being evaluated. Consideration is also being given to use of a truck mounted shredder(s) as part of centralized waste re-packaging area. Therefore, specific information relating to manufacturer specification is under review. However, either approach will include construction of secondary containment which encloses the area surrounding the shredding equipment and the bagging/ containerization area. Use of supplementary engineering controls is also planned for use with this equipment. Supplementary engineering controls may include, but not be limited to, use of HEPA equipped negative ventilation for general area ventilation within the secondary containment, HEPA equipped negative ventilation equipment for localized ventilation and/or use of misting or other dust suppression techniques.

Material Transport

Waste materials from the abatement project will be wetted with amended water and placed into lined and covered bulk material containers staged within the active work area. Inclined chutes will not be utilized for transfer of asbestos-containing or asbestos-contaminated waste from the asbestos project work areas. The containers shall be lowered using controlled methods (hoist, elevator) to the waste re-packaging area which is tentatively proposed to be on the Mezzanine Level. The containers will be moved into the secondary containment area constructed around the waste re-packaging area. The use of an “inclined dust-free chute” shall be in conformance with the requirements of ICR 56-12(d) and will be limited to transport of waste from the waste re-packaging area to the waste transport container. It is anticipated that the secondary containment enclosing the waste re-packaging area will be located on the Mezzanine level and the waste container will be located at ground level. The exact location of the waste re-packaging area and transport container will be determined upon finalization of both the site traffic and staging logistics plan.

Use of a Dust-Free Inclined Chute Directly into a "Bladder" Bag Installed within the Waste Container for use within a Negative Pressurized Containment Waste Repackaging Regulated Area

1. If the bladder bag waste container option is utilized, the removed ACBM (and other asbestos waste if deemed suitable by the contractor) shall be transported for disposal in a hinged-top six-sided hard wall container (“disposal container”) lined with a "bladder" bag. The "bladder" bag shall consist of a pre-fabricated fire-retardant multi-layered leak-tight container with a nominal 20-mil (1 mil = 0.001 inches) thickness.

2. The chute shall be air and dust tight along its lateral perimeter and at the terminal connection to the "bladder" bag at ground level.

3. Prior to transport from the site, the bladder bag within the disposal container shall be wrapped and sealed and the top of the disposal container shall be closed and sealed over the top of the load. The upper end of the chute shall be furnished with a hinged lid, to be closed when the chute is not being used.

4. Disposal containers staged and loaded within the Building or active work area shall be enclosed within a fully framed and sheathed enclosure of sufficient size to accommodate the

entire disposal container. The interior of the disposal container enclosure shall be fully lined with at least two (2) layers of 6-mil polyethylene sheeting ("poly") and sealed with tape. A minimum of eight (8) air changes per hour shall be maintained within the disposal container enclosure.

5. Prior to transport from the work site, the disposal container will be disconnected from the chute and sealed air and dust tight utilizing 6-mil poly and tape. The asbestos waste will be transported in the disposal container in accordance with applicable federal, state and local laws.

6. Asbestos contaminated tools and equipment shall be decontaminated by utilizing the attached waste decontamination enclosure system ("waste decon") in conjunction with the applicable requirements of Subpart 56-5.1. Storage of waste materials in the clean room area of the personnel decon shall be prohibited.

7. The exterior surfaces of waste containers shall be thoroughly decontaminated by wet wiping and/or HEPA vacuuming prior to release from the site.

Use of a Dust-Free Inclined Chute Directly into a Double Lined Waste Container for use within a Negative Pressurized Containment Waste Repackaging Regulated Area

1. If the chute to double-lined container option is utilized, removed ACBM and other asbestos wastes shall be transported for disposal in a hinged-top six-sided hard wall container ("disposal container") lined with a two (2) layers of 6-mil fire-retardant poly.

2. The chute shall be air and dust tight along its lateral perimeter and at the terminal connection to the Double Lined Waste Container at ground level.

3. Prior to transport from the site, the 6-mil poly within the disposal container shall be wrapped and sealed and the top of the disposal container shall be closed and sealed over the top of the load. The upper end of the chute shall be furnished with a hinged lid, to be closed when the chute is not being used.

4. Disposal containers staged and loaded within the Building or active work area shall be enclosed within a fully framed and sheathed enclosure of sufficient size to accommodate the entire disposal container. The interior of the disposal container enclosure shall be fully lined with at least two layers of 6-mil poly and sealed with tape. A minimum of eight (8) air changes per hour shall be maintained within the disposal container enclosure.

5. Pending disposal, asbestos-contaminated waste shall be placed in the disposal container with at least 6-mil plastic draped loosely over the sides to facilitate being wrapped over the top of the load and sealed prior to transport from the site.

6. Prior to transport from the work site, the disposal container will be disconnected from the chute and sealed air and dust tight utilizing 6-mil poly and tape. The asbestos waste will be

transported in the disposal container in accordance with applicable federal, state and local laws.

7. Asbestos contaminated tools and equipment shall be decontaminated by utilizing the attached waste decon in conjunction with the applicable requirements of Subpart 56-5.1. Storage of waste materials in the clean room area of the personnel decon shall be prohibited.

8. The exterior surfaces of waste containers shall be thoroughly decontaminated by wet wiping and/or HEPA vacuuming prior to release from the site.

2.12 WASTE PACKAGING AND LOAD OUT PROCEDURES

Packaging of deconstruction waste (ACBM, asbestos and COPC contaminated materials and settled dust) shall conform to the requirements outlined within Waste Sampling Plan found within Section 1 of the Deconstruction Plan. Potential waste streams include the following: asbestos; hazardous; universal; and regulated. The handling, packaging and storage of these materials shall comply with all applicable federal, state and local statutes, rules, and regulations. Specific requirements for decontamination of waste containers and load out through decontamination enclosure systems are outlined below:

A. Decontamination of Impermeable Containers and Non-porous Building Materials: The following procedure shall be used when removing wastes from the work area for load out through the waste decontamination enclosure system:

   1. Waste shall be placed within properly labeled disposal containers in accordance with the waste characterization. Large items not able to fit into disposal containers shall be wrapped in two (2) layers of 6-mil thick plastic sheeting. Clean outer covering of waste containers by wet cleaning and/or HEPA vacuuming in the work area before transferring such items into the decontamination enclosure system.

   2. Waste shall be transported from the upper floors via the exterior hoist or designated internal elevator. Waste leaving individual floors via exterior hoist, shall pass through a waste decontamination enclosure on that particular floor. Waste leaving the individual floors via the internal elevator shall be taken to the waste decontamination enclosure system on the first floor. The waste shall then be transported by the use of a plastic dolly or other necessary means to a temporary on site storage area applicable to the specific waste stream or loaded directly onto a transport vehicle.

   3. Load-out of containers from the decontamination enclosure holding area shall be performed by workers who have entered the equipment decontamination enclosure system from the uncontaminated non-work area. Workers moving waste to storage areas or directly onto transportation vehicles shall do so in overalls of a color different than from those being used in the work area. Workers shall not enter from uncontaminated areas into the equipment washroom or the

work area. Contaminated workers shall not exit the work area through the equipment decontamination enclosure system.

4. Thoroughly clean the equipment decontamination enclosure system immediately upon completion of the waste load-out activities, and at the completion of each work shift.

2.13 TRANSPORTATION AND DISPOSAL OF WASTE

Transportation and disposal of deconstruction waste shall conform to the requirements outlined within Waste Management Plan found within Section 1 of the Deconstruction Plan. Potential waste streams include the following: asbestos; hazardous; universal; and regulated.

A. Documentation

1. All asbestos waste shall be transported to a licensed and permitted disposal facility using a properly completed and original "Waste Shipment Record" form. This form shall be signed and dated by the licensed abatement contractor , the Contractor and the Waste Transporter, and a copy retained by each party as responsibility for the waste is transferred to the next party. All original shipping records and waste receipts shall be provided to the Contractor with copies to the Environmental Consultant Project Monitor and the Owner.

2. All hazardous waste shall be transported to a licensed and permitted disposal facility using a properly completed and original "Hazardous Waste Manifest". The licensed abatement contractor and the Waste Transporter shall sign the manifest. All original documents shall be provided to the Contractor with copies to the Environmental Consultant Project Monitor and the Owner.

3. All universal waste shall be transported to a licensed and permitted disposal facility using a properly completed and original "Universal Waste Manifest". The licensed abatement contractor and the Waste Transporter shall sign the manifest. All original documents shall be provided to the Contractor with copies to the Environmental Consultant Project Monitor and the Owner.

4. All regulated waste shall be transported to a licensed and permitted facility using a properly completed and original "Non-hazardous Waste Manifest". The licensed abatement contractor and the Waste Transporter shall sign the manifest. All original documents shall be provided to the Contractor with copies to the Environmental Consultant Project Monitor and the Owner.

5. The intent is to provide a complete and unbroken chain of a custody and disposal record for the Owner's permanent record.

B. Transporting Waste

1. Trucks hauling waste shall be totally enclosed to prevent loss or damage to waste containers en route to an approved disposal facility. The interior of the vehicles transporting only asbestos waste shall be lined with two layers of 6-mil polyethylene.

2. All vehicles used to transport the waste shall be properly placarded prior to the commencement of loading activities in accordance with all applicable federal, state and local laws, rules, and regulations.

3. For asbestos waste, only sealed packages are permitted to be deposited in a landfill. Damaged, broken seal or leaking packages shall be re-sealed by the transporter or the disposal facility prior to being deposited in the landfill.

4. The licensed abatement contractor will insure that the transporter chosen to haul the waste does so in a way that insures the integrity of the waste during shipment.

5. All transporters shall have a written Spill Contingency Plan in place prior to shipping any materials off site. For more detail, refer to Section 1 of the Deconstruction Plan ("Waste Management Plan for the 130 Liberty Street Deconstruction Project").

C. Disposal.

1. Disposal manifest will be submitted to the Contractor for information verification.

2. The licensed abatement contractor will 1) maintain the copies of each waste manifest during project period; 2) within 30 days of shipment, provide a transporter manifest, a bill of lading or landfill receipt ticket duly executed by the Abatement Subcontractor, transporter and disposal facility. In addition, a final project report shall be submitted by the licensed abatement contractor within the same time frame. The documents will be all inclusive describing:

    a. Volume/quantity of materials

    b. Dates of transport, name of transporter, driver and vehicle number

    c. Date of receipt and disposal

3. The registered waste hauler will transport waste directly to the approved disposal, recycling or transfer facility. Travel routes as proposed within Section 1 (Waste Management Plan) of the 130 Liberty Street Deconstruction Plan shall be strictly followed. No intermediate storage of waste material (i.e., licensed abatement contractor's warehouse) will be permitted.

4. At the completion of the Phase I deconstruction activities the licensed abatement contractor will submit a certification letter, in a form acceptable to the LMDC, Contractor, and Environmental Consultant Project Monitor, verifying that the waste disposal documentation tendered throughout the duration of the project is a true and complete copy and that all waste generated at this work site has been transported and disposed of according to applicable regulation and pursuant to law.

5. Upon review of the documents and certification by the licensed abatement contractor that all waste has been disposed of pursuant to applicable law, the Environmental Consultant Project Monitor will approve the project close out.

2.14 ON-GOING AIR MONITORING

A. The Environmental Consultant Project Monitor is responsible for the project area Air Monitoring. Daily reports will be sent to the Contractor for record keeping purposes. The Environmental Consultant Project Monitor is to provide for all air monitoring and related activities, separate and independent of that being performed by or for the licensed abatement contractor , as required and specified in applicable laws, rules, and regulations.

B. Daily air monitoring shall be performed each day. Full workshift daily air monitoring shall be conducted during any period of asbestos disturbance (including pre-cleaning, set up, abatement/cleaning, final cleaning and waste removal).

C. During deconstruction, air monitoring outside of the Building will continue on a daily basis, 24-hours per day, regardless of whether work is or is not occurring in the Building. The nature and scope of this monitoring is set forth in the Air Monitoring Section of the Deconstruction Plan

D. All pre-abatement, progress, and final clearance air monitoring will be done in accordance with NYSDOL ICR 56 requirements, this plan, and any site specific variances. COPCs will not be sampled within the interior of the Building except as part of the clearance process.

1. Background air sampling: Background air sampling will not be conducted since static area air sampling has been performed on an on-going basis at the site since 2001.

2. Pre-abatement sampling: The Environmental Consultant Project Monitor shall perform pre-abatement area monitoring during preparatory activities as required by ICR 56-17.2 during each abatement sequence.

3. Progress air sampling data will be evaluated by the Environmental Consultant Project Monitor on a daily basis (this evaluation will be included in the daily reports to the Contractor). Any progress air samples noted to be equal to or greater than 0.01 f/cc or background levels must be brought to the immediate attention of the Contractor. Work will be stopped immediately within the impacted area and barriers inspected and repaired as necessary. Abatement methods will be altered to reduce airborne fiber concentration(s) to the aforementioned level and work will not resume until that level is attained. Surfaces outside the work area are to be HEPA vacuumed or wet cleaned prior to resuming removal work.

   Two samples shall be collected exterior of the work area within 10 feet of the containment barrier.

   One area sample shall be taken within ten feet of each unobstructed negative pressure ventilation equipment "group" exhaust.

   One area sample shall be taken in the uncontaminated area exterior of the personnel decontamination enclosure system. One area sample shall be taken in the uncontaminated area exterior of the waste decon area.

   One exterior building sample shall be taken.

   In a typical four-floor sequence, a minimum of twenty-two (22) during abatement samples will be collected on a daily basis. Sample numbers may vary depending on number of floors per sequence.

   In addition to the minimum number of samples required by NYS ICR 56, additional samples deemed necessary by the Environmental Consultant Project Monitor will be collected. Additional samples shall be collected if multiple entrances are utilized in an abatement sequence or if the numbers of AFDs are increased based on change in the containment layout.

Air Monitoring of Negative Filtration Unit Exhaust

Each floor in the work area is approximately 35,000 square feet with an average ceiling height of thirteen (13) feet. More than twenty (20) operating HEPA-filtered negative ventilation units will be required to maintain the required air change rates on each floor.

Negative ventilation unit exhausts shall be placed into groups not to exceed five (5) units. One extra group of five (5) HEPA-filtered negative ventilation units shall be installed per work area as a back-up.

One area sample per day shall be taken within ten (10) feet of each unobstructed negative pressure ventilation equipment "group" exhaust. Should an air sample

fail, proper response shall include shutting down group of units, activating back-up group of units, repairing units, and performance of multiple rounds of individual unit exhaust air sampling, as defined in the variance decision conditions. An access port will be cut into the rigid barrier to provide access for placement of an exterior air sampling monitor. The access port shall remain sealed during sampling and when not in use.

An Interior Negative Pressure Tent Enclosure, as described in this plan, will be used and maintained to create the air sampling access port for negative air exhaust air sampling at each bank of negative exhaust air filtration unit manifolds, should exterior access be restricted. This tent enclosure will also be used to access the air sampling port to facilitate negative air exhaust air sampling exterior to the building. The interior tent enclosure will be maintained until final clearance air sampling is performed.

If an elevated exhaust air sample is obtained, the bank of 5 units with the elevated result will be shut down, the units and filters inspected, repaired/changed out as necessary, and then put back into service. Each of those five units will be sampled independently for a minimum of three days to ascertain if any problems still exist. Upon receipt of additional elevated air sample results, the affected unit(s) will be taken out of service and removed from the work area for appropriate repair.

2.15 AIR CLEARANCES

HEPA ventilation units shall be operated at a maximum of two (2) air changes per hour during clearance sampling.

Clearance air monitoring may be performed on individual floors within the active Work Area Grouping as follows. The floor(s) to be cleared individually will be isolated from the balance of the Work Area Grouping at the completion of gross removal and gross clean-up within the floor(s) to be cleared. Airlock(s) with a minimum dimension of 3'x 3' will be constructed at (a) the entrance to the clean vertical shaft on the isolated floor(s) and (b) at the entrance to the isolated floor(s) from the balance of the Work Area Grouping. Personnel proceeding to the isolated floor in the final cleaning stage shall don two suits within the personnel decon, and shall then remove their outer suit prior to entering the airlock at the entrance to the isolated work area that is in the final cleaning stage. Upon achieving satisfactory clearance air sampling results, the cleared floor shall be isolated from the balance of the Work Area Group**.**

Upon completion of all work within each floor of the negative pressure work area the following work practices will apply:

- The entire work area shall be thoroughly washed (a pressure wash system may be used) using amended water and HEPA vacuumed dry.
- All standing water shall be collected by HEPA vacuuming or mopping the area. All standing water shall be removed.

- Wall/Floor poly, as applicable, shall be encapsulated and removed. All standing water shall be removed.

Following a minimum drying time of four (4) hours after wet cleaning has been completed, an authorized and qualified individual, independent of the removal project, such as the Project Monitor or Design Engineer, shall determine if the surfaces in the work area are dry and free of dust and debris. Once the accessible work area has been inspected and found to be clean and dry, aggressive clearances may be performed.

The asbestos abatement portion of the project shall be considered complete within each work area when the area is visually clean of all dust and the results of aggressive interior air clearance sampling, collected following "aggressive" air sampling techniques as per ICR 56 17.2 (f), are below the asbestos clearance criteria of 70 structures/mm^2 (collected and analyzed in accordance with AHERA TEM protocols) A minimum of five (5) air samples shall be collected and analyzed per work area. A minimum of five (5) asbestos air samples per floor will be collected. Where areas fail the visual inspection or the average concentration of the five (5) samples exceeds 70 structures/mm2, the work area must be re-cleaned and re-tested until successful air clearance is achieved.

In addition to the asbestos abatement clearance air sampling, a minimum of five (5) air samples shall be collected per floor following "aggressive" air sampling techniques and analyzed for all of the contaminants listed below. The sampling may be performed concurrent with or subsequent to asbestos abatement clearance air monitoring. Although the asbestos abatement cleanup portion of the project under ICR 56 will be deemed complete following receipt of successful TEM clearance air sample results, containments will remain and the area will be sampled and re-cleaned, as and if necessary, to achieve the following supplemental air clearance levels:

Metals (NIOSH protocols)	**Clearance Level**
Antimony	250 ug/m^3
Barium	250 ug/m^3
Beryllium	1.0 ug/m^3
Cadmium	5.0 ug/m^3
Chromium (III)	250 ug/m^3
Copper	500 ug/m^3
Lead	25 ug/m^3
Manganese	100 ug/m^3
Mercury	12.5 ug/m^3
Nickel	50 ug/m^3
Zinc	1,000 ug/m^3

PART 3 - PRODUCTS

MATERIALS

Materials provided under this section shall be standard products of manufacturers regularly engaged in the production of such materials and shall conform to federal, state, and city regulations and requirements specified herein. Materials listed under this section "or equal" shall be provided for work. Note: all applicable spent materials will undergo a waste characterization in accordance with protocols outlined within Section 1 of the Deconstruction Plan.

A. Polyethylene or poly: Fire retardant polyethylene of 6-mil thickness shall be provided in rolls of sizes that will minimize the frequency of joints. Fire retardant polyethylene sheet may be used for plasticizing the enclosed work area, for preparation of the decontamination enclosure system and for waste packaging.

B. Duct Tape: Duct tape shall be capable of sealing joints of adjacent sheets of plastic and of attaching plastic sheeting to finished surfaces without damage to existing finish and shall be capable of adhering under both dry and wet conditions, including use of amended water. When used on windows the tape shall be ultra violet light stable and shall not leave residue when removed. Nashua 357 Black Duct Tape or equivalent shall be used for all window applications. This tape can be used for all applications relative to this project.

C. Surfactant: Surfactant (Wetting Agent) shall consist of resin materials in a water base which has been tested to ensure materials are non-toxic and non-hazardous. Surfactants shall be installed according to the manufacturer's written instructions.

D. Caulking Sealant: Caulking sealant shall be single component, non-sag elastomer with 1600% elongation capacity. Sealant shall meet the requirements of Federal Specification TT-S-00230C, Class A Type II. Sealant may be used to form an airtight seal around plywood barriers or temporary partitions, to seal along the seams of the decontamination enclosure system's plywood sheathing and to seal around piping or other small penetrations of the work area. Sealant application shall be according to the manufacturer's written instructions.

E. Encapsulant: A liquid material which can be applied to a surface in order to "lock down" any materials on that surface by creating a membrane over the surface (bridging encapsulant) or by penetrating into the material and binding its components together (penetrating encapsulant).

F. Foam Sealant: Foam Sealant shall be expanding urethane Class 1 foam sealant with a Underwriters Laboratories, Inc. (U.L. 723) flame spread index of 25 or less, smoke developed index of 0, and a minimum operating temperature range between -30^{o}F and 250^{o}F.

G. Plywood: Plywood used for temporary partitions, decontamination enclosure systems and tunnels shall be an exterior grade and a minimum 3/8-inch thick.

H. Spray Adhesive: Spray Aerosol Adhesive shall be specially formulated to stick to sheet polyethylene (3M 76, 3M 77, or equivalent).

I. Other Materials: All other materials such as lumber, plywood, tools, scrapers, brushes, cleaning materials, adhesive, nails, hardware, etc. which are required to perform the work described in this Section shall be provided. Materials and equipment shall be new or used, uncontaminated by asbestos, in serviceable condition and appropriate for the intended purpose.

J. Disposal Bags: Plastic Disposal Bags shall be a minimum of six mils in thickness. Bags shall be labeled in accordance with this Section.

K. Shipping Containers for asbestos waste: Impermeable Containers shall be suitable to receive and retain any asbestos-containing or asbestos-contaminated materials until they are disposed of at an approved landfill. The containers shall be labeled in accordance with this Section. Containers shall be both airtight and watertight and conform to DOT Standard 49 CFR 178.224. Each container shall be constructed of fiber, hard plastic or metal with locking, airtight lids.

L. Markings and Labels for asbestos waste: Disposal bags and shipping containers shall bear danger labels, transportation packaging labels and generator identification information. Labels shall be permanently affixed to all bags and shipping containers containing asbestos waste material, in accordance with OSHA Standard 29 CFR 1926.1101(k)(2), DOT Standard 49 CFR Part 171 and 172 and EPA Standard 40 CFR Part 61.150(a)(1)(v).

M. Shipping Containers for hazardous, universal and regulated non-hazardous waste: these materials be handled, packaged, transported and disposed of in accordance with procedures outlined with the Waste Sampling Plan found within Section 1 of the Deconstruction Plan. Markings and Labels for hazardous, universal and regulated non-hazardous waste shall be in accordance with the requirements outlined within the Waste Management Plan found within Section 1 of the Deconstruction Plan as well as all applicable federal, state and local regulations.

N. Warning Signs: Warning Signs shall be posted at the perimeter of the work area and every potential entry point into the work area prior to abatement operations in accordance with OSHA Standard 29 CFR 1926.1101. Danger sign format and color shall conform to OSHA Standard 29 CFR 1926.200. The signs shall display the legend indicated below:

DANGER
ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE
CLOTHING ARE REQUIRED IN THIS AREA

EQUIPMENT

All equipment provided shall conform to applicable federal and state regulations, local codes and the requirements specified herein.

A. The licensed abatement contractor shall maintain on site an emergency generator capable of powering all active work areas, the Personnel and Waste Decontamination Enclosure System, and to maintain required negative pressure in the event of a power failure.

B. Communication Equipment: Devices suitable for inter-room communications such as "walkie-talkies" or "radio band" communicators shall be provided.

C. Spraying Equipment: Equipment used to apply amended water or removal encapsulant shall be of a low pressure type to prevent disturbance of the asbestos prior to physical controlled removal. Airless spray equipment shall be provided for the application of asbestos encapsulant.

D. Vehicles: Trucks or Vans used for the transportation of waste shall be enclosed and suitable for loading, temporary storage, transit and unloading of waste without exposure to persons or property.

E. Fall Protection Equipment: Certified and approved equipment to be used by trained personnel when working at elevation to protect against falling from an elevated work area.

F. Water Filtration System: A system capable of filtering and retaining particles larger than 5.0 microns in size shall be provided.

G. Carts: Provide water tight wheeled carts with tight fitting lids suitable for movement of waste from the decontamination enclosure system to the waste storage area or transport vehicle.

WORKER PROTECTIVE CLOTHING AND EQUIPMENT

A. Protective Clothing: Workers shall be provided with sufficient sets of properly fitting, full-body, disposable coveralls, head covers, gloves and 18-inch high boot-type foot covers. Disposable coveralls, head covers and 18-inch high boot-type foot covers shall be constructed of material equal to DuPont "TYVEK-Type 14" or Kimberly-Clark "Kleenguard" as a minimum requirement.

1. The licensed abatement contractor shall provide authorized visitors and the Environmental Consultant Project Monitor suitable properly fitting protective disposable clothing, headgear, hard hats, eye protection and footwear (up to four sets per 8-hour shift) whenever they are required to enter the work area.

B. Equipment: Eye protection and hard hats shall be utilized at all times on this project everywhere within the established site perimeter in accordance with the HASP.

C. Respiratory Protection: The Contractor and Subcontractors shall be responsible for providing adequate respiratory protection for their staff at all times in the work area. Types of respirators used shall be approved by MSHA/NIOSH for asbestos and the identified COPCs in accordance with all applicable federal, state, and city regulations. The Contractor and Subcontractor shall provide a level of respiratory protection to ensure personnel exposures are below all applicable permissible exposure limits.

NEGATIVE PRESSURE FILTRATION SYSTEM

The licensed abatement contractor will provide enough HEPA filtered negative air units to meet the requirements of the site specific variance and maintain negative pressure drop of at least -0.02 inches water column as verified by continuous recording digital manometers located throughout the work area. The licensed abatement contractor will demonstrate the number of units needed per work area for the required air changes by calculating the volume flow rate (cfm) delivered by each unit under a 2-inch pressure drop across filters. The licensed abatement contractor shall further determine the best placements for all HEPA filtered negative air units on any given floor given its configuration and the focus of the Work activities at any given time as well as other pertinent factors to ensure the optimum air filtration is achieved. All units shall be equipped with an operating audible alarm to signal a loss of filtration below an established level.

Preliminary calculations, based on 4 air changes per hour, indicate a need for twenty-two (22), 1,500 cfm negative air units per floor. This is determined by utilizing the formula (CF/(CFM * 15M) = # of units needed) wherein CF represents the volume of the enclosure, CFM represents the capacity of the filtration unit and 15M represents fifteen (15) minutes required for a complete air change. The average volume of air space per floor is 480,000 cubic feet. The exact number of units on each floor shall be field verified based on the cubic footage per floor. On the fifth floor mechanical space where the height of the ceiling deck is twice that of the other floors, twice as many negative air units shall be utilized to achieve the required pressure differential.

One (1) additional bank of five (5) negative exhaust air units will be installed in each work area as a back-up to maintain the minimum required air changes per hour should a primary bank of five (5) units be taken out of service during required shutdowns. If an elevated exhaust air sample is obtained, the bank of five (5) units with the elevated result will be shut down, the units and filters inspected, repaired/changed out as necessary, and then put back into service. Each of those five units will be sampled independently for a minimum of three days to ascertain if any problems still exist. Upon receipt of additional elevated air sample results, the affected unit(s) will be taken out of service and removed from the work area for appropriate repair.

The Environmental Consultant Project Monitor may reject any HEPA filtered negative air units that are deemed to be unacceptable or performing marginally based on visible inspection or performance.

The HEPA filtration ventilation units will be exhausted to the exterior of the building by use of flexible duct connection and existing window portals or the licensed abatement contractor shall create additional portals sufficient for the number of negative air units. The flex duct will extend outside the window and window portal a distance of approximately one (1) foot or less.

A. licensed abatement contractor will provide:

1. Manufacturer's product data on the HEPA units.

2. Methods of supplying adequate power to the units and designation of panels supplying power.

3. Description of testing methods for correct airflow and pressure differential and manufacturer's product data on a pressure differential monitor.

B. Negative Air Machines (HEPA Units):

1. Cabinet: Will be constructed of steel or other durable materials able to withstand damage from rough handling and transportation. Width of the cabinet should be less than thirty (30) inches to fit through standard-size doorways. The cabinet will be factory sealed to prevent asbestos-containing dusts from being released during use, transport or maintenance. Access to and replacement of all filters will be from an intake end. The unit will be mounted on casters or wheels.

2. Fans: Rate capacity of fan according to usable air-moving capacity under actual operating conditions. Use a centrifugal-type fan.

3. Final Filters: The final filter will be the HEPA type. The filter media (folded into closely pleated panels) must be completely sealed on all edges with a structurally rigid frame:

   a. Locate a continuous rubber gasket between the filter and the filter housing to form a tight seal.

   b. Each filter will be individually tested and certified by the manufacturer to have an efficiency of not less than 99.97 percent when challenged with 0.03 um diotcylphthalate (DOP) particles. Testing will be according to Military Standard MIL-STD-282 and Army Instruction Manual 136-300-175A. Each filter will bear a UL586 label to show ability to perform under specified conditions.

   c. Each filter will be marked with: the name of the manufacturer, serial number, air-flow rating, efficiency and resistance and the direction of test air flow.

4. Pre filters: To protect the final filter by removing the larger particles, pre filters are required to prolong the operating life of the HEPA filter. Two (2) stages of pre filtration are required. The first-stage pre filter will be a low-efficiency type (e.g., for particles 10 um and larger). The second-stage pre filter will have a medium efficiency (e.g., effective for particles down to 5 um). Pre filters will be installed either on or in the intake grid of the unit and held in place with special housings or clamps.

5. Instrumentation: Each unit will be equipped with a Magnetic gauge or manometer to measure the pressure drop across filters and to show when filters have become loaded and need to be changed. Provide units equipped with an elapsed time meter to show the total accumulated hours of operation. Units shall also be equipped with an audible alarm indicating that the pressure drop across the filters has dropped below requisite levels.

6. Safety and Warning Devices: Provide an electrical (or mechanical) lockout to prevent the fan from operating without a HEPA filter. Units will be equipped with automatic shutdown system to stop the fan in case of major rupture in the HEPA filter or blocked air discharge. Warning lights are required to show normal operation, too high a pressure drop across the filters (i.e., filter overloading), and too low a pressure drop (i.e., major rupture in HEPA filters or obstructed discharge).

7. Electrical components will be approved by the National Electrical Manufacturers Association (NEMA) and Underwriter's Laboratories (UL). Each unit will be equipped with overload protection sized for the equipment. The motor, fan, fan housing and cabinet will be grounded.

C. Use of System During Abatement Operations

1. Exhaust units shall be started before commencing Phase I Abatement clean-up work. After abatement work has begun, units shall run to maintain a negative pressure until satisfactory clearance air monitoring results have been achieved for the work area. Units shall not be turned off at the end of the work shift or when abatement operations temporarily stop.

2. Do not shut down negative air system during abatement operations procedures unless authorized by the Environmental Consultant Project Monitor.

3. To the extent practical, start abatement work at a location furthest from the decontamination units and proceed toward them. If an electric power failure occurs, immediately stop all removal work and do not resume until power is restored and all exhaust units are operating again. The Personnel and Waste Decontamination Enclosure Systems shall be sealed so as to avoid the release of dust for the duration of any power loss event and remain sealed until power and negative pressure has been adequately re-established.

4. At completion of abatement work, allow exhaust units to run as specified under this section to remove airborne particles that may have been generated during abatement work and cleanup and to purge the work area with clean makeup air. Units will be required to run after decontamination and during final air sampling until final air clearance testing and inspections are completed.

D. Dismantling the System: When a final inspection and the results of the final air tests show that the area meets the requirements for clearance, exhaust units may be sealed and removed from the work area.