

**REVISION 2**

**QUINCY SMELTER ASBESTOS ABATEMENT ASSESSMENT  
FRANKLIN TOWNSHIP, HOUGHTON COUNTY, MICHIGAN**

**Prepared for**

**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**

Region V Emergency Response Branch  
9311 Groh Road  
Grosse Ile, Michigan 48138

**Prepared by**

**WESTON SOLUTIONS, INC.**

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**January 28, 2005**

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## SECTION 1 INTRODUCTION

### 1.1 GENERAL SITE INFORMATION

The Quincy Smelter Site (site) is located at 48991 Maple Street, Ripley, Franklin Township, Houghton County, Michigan. The site coordinates are 47.12° N and 88.54° W. Houghton County is located in the southern part of the Keweenaw Peninsula in the Upper Peninsula of Michigan. The site consists of approximately 25 acres of rectangular-shaped land, encompassing 1,483 feet of shoreline along Portage Lake. A former copper smelter plant and support buildings (total of 27 buildings) occupy the site. Portage Lake is located south of the site; Highway 26 is to the north; and private properties are located to the east and west. The Hancock/Ripley Trail (HRT), a designated snowmobile trail also used for walking, running, and all-terrain vehicles (ATVs), traverses the site from east to west along a former railroad bed. A map of the site is located in Appendix A to this report.

The Quincy Mining Company (QMC) owned and operated the site as part of historic copper mining operations from the mid-1800s until 1969, when it closed. In 1986, the Quincy Development Corporation (QDC) assumed ownership of the QMC property. Franklin Township took ownership from QDC in 1999.

In September 2003 and June 2004, U.S. EPA and Trimedia, a contractor for QDC, conducted a site assessment. Drums, tanks, vats, and small containers containing oils, greases, solvents, powders, and laboratory chemicals were sampled, inventoried, and removed. In addition, presumed asbestos containing materials (PACM) were visually identified inside most buildings and in several locations outside the buildings. Evidence of vandalism in the form of graffiti, broken locks, and dismantled access-control fencing and boards was also documented.

Based on reports from the National Park Service (NPS), Trimedia, and the results of the U.S. Environmental Protection Agency (U.S. EPA) site assessment, U.S. EPA commissioned an

asbestos survey for the site. The survey, which ATC Associates, Inc. (ATC) conducted in June 2004, documented the presence of asbestos-containing material (ACM) inside and outside most of the site buildings and along the HRT. ACM located along the HRT included process parts, such as gaskets and hoses, and pipe insulation that had fallen from an overhead steam pipe attached to a trestle.

In response to these results, the Michigan Department of Natural Resources (MDNR), which owns the HRT, closed the trail. At the request of Franklin Township, the Michigan Department of Environmental Quality (MDEQ) and the NPS, U.S. EPA constructed a perimeter fence around the site to inhibit direct contact with friable asbestos. However, because the HRT is outside the fence line and many of the buildings that line the trail are in advanced state of collapse (no roofs, windows, and/or doors), individuals using the trail could be exposed to airborne asbestos fibers. Therefore, a study was conducted to assess the potential health risk due to asbestos fibers and dust with potentially high concentrations of metals.

The purpose of this asbestos study, which U.S. EPA conducted in August 2004, was to collect data that accurately represents the exposure of typical HRT users to respirable asbestos fibers and metals as particulates in air. Breathing-zone air samples were collected during typical trail user activities, including ATV use, walking while pushing a stroller, and bicycling. The Michigan Department of Community Health (MDCH) and the Agency for Toxic Substances and Disease Registry (ATSDR) have reviewed the study results and concluded that the HRT could be reopened for winter snowmobile use. Further review of study results is necessary to determine allowable trail uses for other purposes.

## **1.2 PROJECT PURPOSE**

Franklin Township and NPS are working toward developing the site as a historic park open to the public. The unsecured, compromised buildings on-site present a source of asbestos that could be released into the air and environment. U.S. EPA tasked Weston Solutions, Inc.

(WESTON®) to conduct an asbestos removal assessment at the site. The objectives of the asbestos removal assessment were to do the following:

- Conduct a building-by-building summary of on-site friable asbestos (based on the results presented in the June 2004 ATC Report);
- Conduct an evaluation of the structural stability of each building on-site considering likely asbestos abatement procedures to address the friable ACM (e.g. placement of glovebags, manlifts, critical barriers, and decontamination stations);
- Prepare a cost estimate for recommended building stabilization methods required for safe asbestos abatement;
- Prepare a cost estimate for multiple (if applicable) asbestos abatement options for each building.

### **1.3 PREVIOUS BUILDING SURVEY INFORMATION**

The project team used previous asbestos survey data as described below to identify the friable ACM on-site. No additional sampling was conducted, and previously identified nonfriable ACM was not included in the cost estimates developed for asbestos abatement. Survey results from the ATC report were accepted as accurate, unless additional on-site asbestos was identified during this assessment. For example, additional ACM was identified in Building 2, and these quantities are estimated in Section 4.2 of this report.

#### **1.3.1 ATC Asbestos Survey Report, June 2004**

ATC of Novi, Michigan, conducted an asbestos survey in June 2004 on behalf of Environmental Quality Management, Inc., contractor to the U.S. EPA. The survey included an assessment of 27 site buildings. A total of 377 samples of suspect ACM, representing 163 homogenous areas, were collected. Prior to sample collection, the ATC asbestos inspectors performed a physical assessment of each material for friability. By definition, “friable” ACM are those that can crumble or be reduced to powder by normal hand pressure when dry. Thus, ACM considered

friable present the greatest risk to human health and the environment. The report found the following friable ACM at the site:

- Interior and exterior pipe insulation, valves, and fittings;
- Duct insulation;
- Gasket materials;
- Hoses;
- Block/breach insulation;
- Asbestos paper rolls;
- Baseboard seam insulation;
- Coil wrap;
- Bulk asbestos insulation in crates/drums;
- Asbestos debris.

Table 24 of the ATC report presents the condition of each type of ACM and its potential for disturbance at the time of the ATC site investigation. Table 24 is attached to this report as Appendix D.

### **1.3.2 Previously Documented Building Conditions On-Site**

In June 2002, Martin and Archimede prepared the *Quincy Mining Company Smelting Works, 1898, Historical Land Use Survey Project* on behalf of the NPS. The report details the site history and includes information building conditions, which are summarized in Appendix E.

In February 2003, Franklin Township and Keweenaw National Historical Park prepared the *Critical Safety and Preservation Needs Assessment, Quincy Mining Company Smelting Works*. The report includes a summary of current building conditions and safety ratings. The conditions of each of the on-site buildings that contain ACM, as of the February 2003 report, are summarized in Appendix E.

In February 2003, Franklin Township and Keweenaw National Historical Park prepared the *Stabilization Plan, Quincy Mining Company Smelting Works*. The report details the condition of

site structures and includes a plan for each building's stabilization for the purpose of historic preservation (stabilization for asbestos abatement may differ from stabilization for historic preservation of the buildings). The stabilization plans for each on-site building that contains ACM are summarized in Appendix E.

## SECTION 2

### PROJECT ORGANIZATION

On December 6, 2004, the project team mobilized to the site. U.S. EPA, WESTON, and U.P. Engineers and Architects (UPEA) began the building-by-building assessment on December 7 and concluded on December 9, 2004. Table 1 summarizes the project organization.

**Table 1**  
**Project Organization**  
**Quincy Smelter Site, Asbestos Abatement Assessment**  
**Franklin Township, Houghton County, Michigan**

<b>Agencies or Parties Involved</b>	<b>Contact</b>	<b>Description of Participation</b>
On-Scene Coordinator U.S. EPA - Region V Division of Superfund Emergency Response Branch 9311 Groh Road Grosse Ile, Michigan 48138	Brian Kelly	Federal OSC.
U.P. Engineers and Architects (UPEA) Structural Engineer 100 Portage Street Houghton, Michigan 49931	George Kiiskila	Primarily responsible for evaluation of site structures for the purpose of asbestos abatement.
Weston Solutions, Inc. Site Lead 20 North Wacker Drive Suite 1210 Chicago, IL 60606	Sarah Meyer	Responsible for completion of project assessment, technical coordination, health and safety oversight, and documentation.
Weston Solutions, Inc. Asbestos Professional 20 North Wacker Drive Suite 1210 Chicago, IL 60606	Todd Carmichael	Responsible for identification of on-site asbestos and evaluation of abatement methods.
Metcalf and Eddy WESTON Subcontractor Structural Engineer 701 Edgewater Drive Wakefield, MA 01880	Michael Malenfant	Responsible for assisting UPEA with evaluating the structural integrity of buildings and the feasibility of abatement procedures.

## SECTION 3

### TECHNICAL APPROACH

#### 3.1 STRUCTURAL ASSESSMENT

Initially, the UPEA structural engineer, with assistance from the Metcalf and Eddy structural engineer, determined if buildings were structurally safe for entry. In cases where buildings were determined safe for entry, the field team entered the building and assessed building stabilization requirements, potential abatement procedures, and equipment required for the abatement of that building from the building interior. In cases where a building was determined to be unsafe for entry, stabilization requirements, potential abatement procedures, and equipment required for that building were assessed from the outside.

Buildings safe for entry included the following:

- Building 2: Dockside Warehouse;
- Building 3: Laboratory;
- Building 11: Cooper Stock Building;
- Building 14: Briquetting Plant;
- Building 16: Pump House;
- Building 17: Cupola Furnace Building;
- Building 18: Boiler House;
- Building 19: Baden Hausen Boiler Building;
- Building 20: Machine Shop; and
- Building 25: Barn.

Buildings not safe for entry included the following:

- Building 6: No. 5 Reverberatory Furnace Building;
- Building 7: Reverberatory Furnace Building; and
- Building 15: Crushing Plant.

A summary of the structural assessments that UPEA and Metcalf and Eddy performed are presented in Appendices B and C, respectively.

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### **3.2 ABATEMENT ASSESSMENT**

Field team members reviewed the ATC *Asbestos Survey Report* (2004) prior to the assessment. Appendix E to this report provides a building-by-building description of friable ACM identified in each of the site buildings. Conventional ACM abatement methods and equipment requirements were evaluated for each building containing friable ACM. All potentially applicable and feasible methods of asbestos abatement or management were evaluated for each building.

Information on the ACM in buildings unsafe for entry was gathered solely from the ATC report. For an accurate abatement assessment, further assessment of the ACM in these buildings may be necessary after stabilization is completed.

A selection of photos representing site conditions on December 7, 8, and 9, 2004, is presented in Appendix F.

### **3.3 POTENTIAL ABATEMENT PROCEDURES**

WESTON has assumed that abatement procedures will be performed in accordance with applicable local, state, and federal laws, including Michigan Occupational Safety and Health Association (MIOSHA) Part 602, the Asbestos Standards for Construction. Cost estimates for asbestos abatement options are provided with the expectation that structural stability will be achieved to the satisfaction of a qualified structural engineer prior to commencement of abatement.

The abatement options for friable ACM at the site fall into the following general categories:

- **Negative Pressure Enclosure (NPE) Systems** – NPE systems generally include an enclosure system with critical seals in place and negative pressure with a minimum of -0.02 column inches of water pressure differential throughout the period of use (via negative air machines).
- **Mini-Enclosure Systems** – Mini-enclosure systems generally include a small walk-in enclosure system under negative pressure that can accommodate up to two persons (high-efficiency particulate air [HEPA] vacuum or similar ventilation unit).
- **Glovebag** – Glovebags are an impervious plastic-bag enclosure, not more than 60 inches by 60 inches, affixed around an ACM with glovelike appendages. Material and tools may be handled through the appendages.
- **Wrap and Cut** – This method is used when a building or facility component, such as a length of piping with ACM on it, is wrapped in plastic sheeting prior to removal. The entire wrapped component is then cut out and removed from the building. In some cases, ACM must be removed from parts of the component to free it from adjacent components, thereby allowing removal. This method can also be used to wrap components with ACM inside them.

Portions of the asbestos abatement activities at the site will require the use of scaffolding or manlifts to access areas of friable ACM.

## SECTION 4 ASSESSMENT RESULTS

### 4.1 REVERBERATORY FURNACE SMOKESTACK (1919)

**Building Description:** The metal smokestack is 96 feet tall and is lined with firebrick. The stack superstructure is heavily deteriorated and in a structurally dangerous condition. The stack support system is heavily corroded and is not providing any support. It is estimated that the potential danger zone of collapse is a radius of approximately 200 feet, affecting a majority of the site.

**Friable Asbestos Summary (quantities from ATC report):** This smokestack does not contain any friable asbestos but presents a structural safety concern. The structural demolition or stabilization of the smokestack must be addressed prior to any abatement work at the site.

#### **Summary of Smokestack Stabilization/Demolition Options and Costs:**

##### Smokestack Demolition

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##### Demolish Smokestack (debris collapsed inside)

International Chimney Corp., 2002 (Engineering and labor costs only)	<b>\$30,000</b>
International Chimney Corp., 2002 (Engineering, labor, equipment, and disposal)	<b>\$64,005</b>

##### Demolish Smokestack (debris lowered to grade)

International Chimney Corp., 2002 (Engineering and Labor Cost Only)	<b>\$50,000</b>
International Chimney Corp., 2002 (as above adding equipment and disposal)	<b>\$90,545</b>
Metcalf and Eddy, 2004 (Engineering and Labor Cost Only)	<b>\$52,093</b>
UPEA, 2004 (demolition to roof level)	<b>\$170,000</b>

##### Smokestack Stabilization Measures Adequate for Asbestos Abatement Activities

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UPEA, 2004	<b>\$200,000</b>
------------	------------------

### **Stack Restoration in Compliance with Historical Preservation Consideration**

International Chimney Corp., 2002 (Engineering and labor costs only) **\$325,000**  
International Chimney Corp., 2002 (Engineering, labor, equipment, and disposal) **\$364,420**

## **4.2 BUILDING NUMBER 2: DOCKSIDE WAREHOUSE**

**Building Description:** The dockside warehouse is a two-story wood timber structure. The first floor interior contains a series of timber columns on regular grid spacing and an enclosed mezzanine. Windows are minimal, with a few spaced evenly along the north side of the ground level and several others located along the south wall of the upper floor. Large door openings, which accommodated the historical handling of materials and supplies, are found on the east and south walls.

**Required Stabilization Summary:** Portions of this building require stabilization as noted in the UPEA *Structural Stabilization Work for Asbestos Abatement Report* (2004). The stabilization measures include:

1. Brace bottom of 2<sup>nd</sup> floor hoisting shed at east end.
2. Remove portion of east side shed collapsed roof enough to remove six (6) drums and any other materials of concern.

**Friable Asbestos Summary (quantities from ATC report):** This building contains pipe insulation (on piping and in bulk storage), pipe insulation debris, and baseboard seam insulation. ACM debris is present in bulk ACM storage areas. The majority of friable ACM is in poor condition. The table below is a summary of the data presented by ATC.

Friable ACM Description	Quantity	At Elevation (Y/N)	Debris Below (Y/N)	Comments
<b>FIRST FLOOR</b>				
Pipe insulation main floor	220 LF	Yes	Yes	Work will require manlift. Pipe insulation assumed to continue into crawl space.
*Debris	700 SF	No	Yes	Floor area below stored bulk ACM should be HEPA vacuumed.
*Pipe insulation (magblock)	20 LF	Yes	Yes	Work will require ladder at minimum.
*Drummed pipe insulation	6 – 7 steel 55 gallon drums	No	Yes	Drums stored in collapsed area of Dockside Warehouse.
<b>SECOND FLOOR LOFT AREA</b>				
Pipe insulation in crates (7) and metal drums (5)	7 crates 5 drums (approximately 300 LF)	No	Yes	Bulk storage area surrounded by debris. Removal may require use of extending forklift to remove wrapped, palletized ACM from second floor.
*Debris	500 SF	No	Yes	Loft floor should be HEPA vacuumed in areas where bulk ACM was stored.
<b>SECOND FLOOR LOCKER ROOMS</b>				
Baseboard seam insulation, packed between boards	50 SF	No	Yes	Insulation between concrete baseboards.
*Pipe insulation	50 LF	No	Yes	Pipe insulation on loose piping on floor and behind radiators.

\*ACM not identified in ATC survey but located during current WESTON investigation

LF = linear feet

SF = square feet

### **Abatement Option Summary**

**Building Layout:** The large first- and second-floor openings of the building will allow ACM load-out for disposal. Some personnel movement up and down the side stairs will be necessary for work in the former locker room area. Movement of stored non-ACM (wood, furniture, etc.)

in the buildings will be minimal. The bulk storage materials on the second floor can be removed via a telescoping forklift through an exterior second-floor materials-handling door on the west side of the building.

**Abatement Procedures:** Prior to abatement, regulated areas (which may include critical seals) must be established. The abatement of the pipe insulation in this building can be accomplished by two methods: Portions that are in good condition and easily accessible could be abated by properly wrapping and cutting in conjunction with glovebagging the remaining portions (Option 1). This option allows the contractor more flexibility in abatement techniques, resulting in some cost benefit. Alternatively, all pipe insulation can be safely abated by glovebagging, leaving all piping systems in place (Option 2). Bulk stored materials can be wetted and removed in their current state or transferred to alternate containers. The majority of the horizontal surfaces in the dockside warehouse, particularly those underneath the loft and wrapped pipe runs, should be HEPA vacuumed. A summary of stabilization and abatement costs are presented below. The cost estimating worksheets are provided in Appendix G.

#### **Stabilization and Abatement Cost Estimates:**

##### **Stabilization Cost Estimate: UPEA, 2004**

Stabilization Item No./Description		Estimated Cost
1.	Brace 2 <sup>nd</sup> Floor Hoisting Shed	\$ 2,000.00
2.	Remove portion of east side shed roof/brace wall	\$ 5,000.00

**Building No. 2 Stabilization Total    \$       7,000.00**

**Abatement Option 1:** Abatement by Gross Removal and Pipe Insulation Wrap and Cut and/or Glovebag

Abatement Description		Estimated Cost
1.	Gross removal and debris cleanup	\$ 10,000.00
2.	Pipe insulation: wrap and cut (portions) and glovebag	\$ 2,475.00
Option 1 Abatement Estimate		\$ 12,475.00*
Stabilization Estimate		\$ 7,000.00

**Building No. 2 Option 1 Total \$ 19,475.00\***

**Abatement Option 2:** Abatement by Gross Removal and Pipe Insulation Glovebag Only

Abatement Description		Estimated Cost
1.	Gross removal and debris cleanup	\$ 10,000.00
2.	Pipe insulation: glovebag only	\$ 3,300.00
Option 2 Abatement Estimate		\$ 13,300.00*
Stabilization Estimate		\$ 7,000.00

**Building No. 2 Option 2 Total \$ 20,300.00\***

\*- Does not include a cost for mobilization, third-party oversight, structural engineer oversight, or markup for site-specific conditions for asbestos abatement.

#### **4.3 BUILDING NUMBER 3: LABORATORY/ ASSAY HOUSE**

**Building Description:** This single-story wooden-frame building has lap siding, a corrugated metal roof with gable ends, and an exterior brick chimney on the west wall. Most windows are double hung with one small, square window fixed on the upper south elevation. The building has a concrete basement.

**Required Stabilization Summary:** Portions of this building require stabilization as noted in the UPEA *Structural Stabilization Work for Asbestos Abatement Report* (2004). The stabilization measures include the following:

1. Patch/stabilize top of brick chimney;
2. Stabilize top of steel chimney and braces on top of roof;
3. Repair pushed-in and rotted wall at south side of lower shed.

**Friable Asbestos Summary (quantities from ATC report):** This building contains pipe insulation in the basement as well as pipe insulation debris and thermal heat shields on the first floor. ACM debris is present on the floor around each area. The majority of friable ACM is in poor condition. The table below is a summary of the data ATC presented.

Friable ACM Description	Quantity	At Elevation (Y/N)	Debris Below (Y/N)	Comments
Stack block insulation (outdoors)	20 SF	No	No	Gross removal (outdoors)
Heat shield on east wall of northeast room	5 SF	No	Yes	Gross removal
Debris by north door	1 SF	No	Yes	Gross removal
Pipe insulation in basement	60 LF	No	Yes	Glove bag and debris cleanup
Heat shield in northwest shed	10 SF	No	Yes	Gross removal

LF = linear feet  
 SF = square feet

No additional homogeneous friable ACM was noted.

### **Abatement Option Summary**

**Building Layout:** Load-out of ACM for disposal from the first floor and basement is possible with the current building layout. Some personnel movement up and down the side stairs will be necessary for work in the basement. Movement of stored non-ACMs in the buildings will be

significant, and some non-ACM will require decontamination due to their proximity to ACM and potential cross contamination.

**Abatement Procedures and Cost Estimate:** Prior to abatement, regulated areas (which may include critical seals) must be established. The abatement of the pipe insulation in this building can be accomplished by two methods: Portions that are in good condition and easily accessible could be abated by properly wrapping and cutting in conjunction with glovebagging the remaining portions (Option 1). This option allows the contractor more flexibility in abatement techniques, resulting in some cost benefit. Alternatively, all pipe insulation can be safely abated by glovebagging, leaving all piping systems in place (Option 2). A large portion of the basement floor must be cleaned due to the presence of pipe insulation debris on the floor. Also, the floor around the heat shields and debris areas will require extensive cleaning. Removal of the stack block insulation may require limited disassembly of the flue to remove the friable material.

#### **Stabilization and Abatement Cost Estimates:**

#### **Stabilization Cost Estimate: UPEA, 2004**

Stabilization Item No./Description		Estimated Cost
1.	Patch brick chimney	\$ 800.00
2.	Stabilize steel chimney	\$ 200.00
3.	Repair wall lower shed south	\$ 800.00

**Building No. 3 Stabilization Total      \$      1,800.00**

**Abatement Option 1:** Abatement by Gross Removal and Pipe Insulation Wrap and Cut and/or Glovebag

Abatement Description		Estimated Cost
1.	Gross removal and debris cleanup	\$ 2,350.00
2.	Pipe insulation: wrap and cut (portions) and glovebag	\$ 540.00
Option 1 Abatement Estimate		\$ 2,890.00*
Stabilization Estimate		\$ 1,800.00

**Building No. 3 Option 1 Total \$ 4,690.00\***

**Abatement Option 2:** Abatement by Gross Removal and Pipe Insulation Glovebag Only

Abatement Description		Estimated Cost
1.	Gross removal and debris cleanup	\$ 2,350.00
2.	Pipe insulation: glovebag only	\$ 600.00
Option 2 Abatement Total		\$ 2,950.00*
Stabilization Estimate		\$ 1,800.00

**Building No. 3 Option 2 Total \$ 4,750.00\***

\*- Does not include a cost for mobilization, third-party oversight, structural engineer oversight, or markup for site specific conditions for asbestos abatement for asbestos abatement.

#### **4.4 BUILDING NUMBER 6: NO. 5 REVERBERATORY FURNACE BUILDING (1904)**

**Building Description:** This building is a large two-story sandstone structure. The roof has been altered and replaced, and three of the four original furnaces have been removed. The building has major burn damage and was determined to be unsafe for further inspection in December 2004.

**Required Stabilization Summary:** Portions of this building require stabilization as noted in the UPEA *Structural Stabilization Work for Asbestos Abatement Report* (2004). The stabilization measures include the following:

1. Stabilize/repair chimney stack (top and bottom);
2. Remove all rusted-through roofing metal, cupola windows, and any other loose overhead materials prior to asbestos removal;
3. Reattach loose steel wall panels;
4. Shore or evaluate existing catwalks at time of removal for structural soundness.

**Friable Asbestos Summary (quantities from ATC report):** WESTON's asbestos professional did not conduct a complete review during the December 2004 assessment due to the poor structural integrity of the building. The table below is a summary of the data ATC presented.

Friable ACM Description	Quantity	At Elevation (Y/N)	Debris Below (Y/N)	Comments
Pipe insulation (aircell)	20 LF	Yes (assumed*)	Yes (assumed*)	Assumed scaffolding or manlift required
Pipe insulation (magblock)	30 LF	Yes (assumed*)	Yes (assumed*)	Assumed scaffolding or manlift required
Duct wrap insulation	20 SF	Yes (assumed*)	Yes (assumed*)	Assumed scaffolding or manlift required

\*Assumptions based on 2004 ATC report

LF = linear feet

SF = square feet

### **Abatement Option Summary**

**Building Layout:** The building access points will allow for movement of scaffolding or a manlift through the large outer doors. It is assumed that movement of stored non-ACM in the building will be significant, and some non-ACMs will require decontamination due to their proximity to ACM and potential cross contamination.

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**Abatement Procedures:** Prior to abatement, regulated areas (which may include critical seals) must be established. It is assumed that the abatement of the pipe insulation in this building can be accomplished by two methods: Portions that are in good condition and easily accessible could be abated by properly wrapping and cutting in conjunction with glovebagging the remaining portions (Option 1). This option allows the contractor more flexibility in abatement techniques, resulting in some cost benefit. Alternatively, all pipe insulation can be safely abated by glovebagging, leaving all piping systems in place (Option 2). It is also assumed that the duct wrap abatement will require the construction of some type of mini-enclosure. A large portion of the floors/catwalks will need to be decontaminated due to the pipe insulation/duct wrap debris.

Based on knowledge of typical furnace construction, it is possible that the original furnace in this building contains interior friable ACM. After stabilization of this building is completed, an additional inspection of the furnace is recommended.

#### **Stabilization and Abatement Cost Estimates:**

**Stabilization Cost Estimate:** UPEA, 2004

Stabilization Item No./Description		Estimated Cost
1.	Remove roof panels/debris	\$ 20,000.00
2.	Wall panels reattach	\$ 8,000.00
3.	Catwalks shored/evaluated	\$ 5,000.00

**Building No. 6 Stabilization Total \$ 33,000.00**

**Abatement Option 1:** Abatement by Gross Removal and Pipe Insulation Wrap and Cut and/or Glovebag

Abatement Description		Estimated Cost
1.	Gross removal and debris cleanup	\$ 1,900.00
2.	Pipe insulation: wrap and cut (portions) and glovebag	\$ 563.00
Option 1 Abatement Estimate		\$ 2,463.00*
Stabilization Estimate		\$ 33,000.00

**Building No. 6 Option 1 Total \$ 35,463.00\***

**Abatement Option 2:** Abatement by Gross Removal and Pipe Insulation Glovebag Only

Abatement Description		Estimated Cost
1.	Gross removal and debris cleanup	\$ 1,900.00
2.	Pipe insulation: glovebag only	\$ 750.00
Option 1 Abatement Estimate		\$ 2,650.00*
Stabilization Estimate		\$ 33,000.00

**Building No. 6 Option 2 Total \$ 35,650.00\***

\*- Does not include a cost for mobilization, third-party oversight, structural engineer oversight, or markup for site specific conditions for asbestos abatement for asbestos abatement.

#### **4.5 BUILDING NUMBER 7: REVERBERATORY FURNACE BUILDING (1898)**

**Building Description:** This large, clear-span post-and-beam structure has a roof and sides of corrugated metal. Large sliding doors provide access on the north and south side and into the sandstone reverberatory furnace building to the west. The building has major burn damage. This building was determined to be unsafe for further inspection in December 2004.

**Required Stabilization Summary:** Portions of this building require stabilization as noted in the UPEA *Structural Stabilization Work for Asbestos Abatement Report* (2004). The stabilization measures include the following:

1. patch miscellaneous masonry for stabilization only;
2. Stabilize 3-foot-diameter boiler pipe on north half of building;
3. Remove all loose and rusted-through roofing metal, cupola windows, and other loose overhead materials prior to asbestos removal on northside of building;
4. Repair all loose stone lintel along the walls of the building. Rebuild the stone window lintel in southwest corner.

**Friable Asbestos Summary (quantities from ATC report):** WESTON's asbestos professional did not conduct a complete review during the December 2004 assessment due to the poor structural integrity of the building. The table below is a summary of the data ATC presented.

Friable ACM Description	Quantity	At Elevation (Y/N)	Debris Below (Y/N)	Comments
Pipe insulation (aircell) middle of north wall	30 LF	Yes	Yes	Work requires the use of a manlift.
Pipe insulation debris northeast corner under lift	25 SF	No	Yes	Gross removal at ground level.

LF = linear feet

SF = square feet

### **Abatement Option Summary**

**Building Layout:** The building access points will allow for movement of scaffolding or a manlift through the large outer doors. Movement of stored non-ACM in the buildings will be moderate, and some non-ACM will require decontamination due to their proximity to ACM and potential cross contamination.

**Abatement Procedures:** Prior to abatement, regulated areas (which may include critical seals) must be established. The height of the existing pipe insulation generally excludes wrapping and cutting; therefore, glovebags can be used exclusively to abate the ACM safely. This will leave the piping systems in place. A portion of the floor will require cleaning due to pipe insulation debris on the floor.

**Stabilization and Abatement Cost Estimates:**

**Stabilization Cost Estimate:** UPEA, 2004

Stabilization Item No./Description		Estimated Cost
1.	Masonry patching	\$ 2,000.00
2.	Stabilize 3-foot boiler pipe	\$ 3,000.00
3.	Remove roof panels/debris	\$ 20,000.00
4.	Repair stone lintels	\$ 3,000.00

**Building No. 7 Stabilization Total \$ 28,000.00**

**Abatement Estimate:** Abatement by Gross Removal, and Pipe Insulation Glovebag Only

Abatement Description		Estimated Cost
1.	Gross removal and debris cleanup	\$ 850.00
2.	Pipe insulation: glovebag	\$ 450.00
Abatement Estimate		\$ 1,300.00*
Stabilization Estimate		\$ 28,000.00

**Building No. 7 Total \$ 29,300.00\***

\*- Does not include a cost for mobilization, third-party oversight, structural engineer oversight, or markup for site specific conditions for asbestos abatement for asbestos abatement.

#### **4.6 BUILDING NUMBER 11: COOPER STOCK BUILDING**

**Building Description:** This building is a 42-foot-by-26-foot 1.5-story wood-frame structure with a gabled, corrugated-metal roof on a stone foundation. The upper floor space is accessible for storage via an interior wall-mounted ladder. The entrance is defined by a small, enclosed porch addition with a small, gabled roof. Traditional double-hung windows are present.

**Required Stabilization Summary:** Portions of this building require stabilization as noted in the UPEA *Structural Stabilization Work for Asbestos Abatement Report* 2004. The stabilization measures include the following:

1. Patch hole in floor boards in loft;
2. Construct Occupational Safety and Health Administration (OSHA) handrail for stairs.

**Friable Asbestos Summary (quantities from ATC report):** This building contains pipe insulation and debris in various areas of the loft and the exterior of the building. The first floor contains deteriorated gasket material and a deteriorated ACM hose in various areas of the work space. The majority of friable ACM is in poor condition, with debris on the floor around each area. The table below is a summary of the data ATC presented.

<b>Friable ACM Description</b>	<b>Quantity</b>	<b>At Elevation (Y/N)</b>	<b>Debris Below (Y/N)</b>	<b>Comments</b>
Pipe insulation loft area, and exterior	230 LF	Yes	Yes	Exterior (approx 50 LF) requires the use of a manlift.
Gasket material	100 LF	No	Yes	Gross removal at ground level.
Small hose	10 LF	No	No	Gross removal at ground level.

LF = linear feet  
SF = square feet

### **Abatement Option Summary**

**Building Layout:** The building access points will allow for movement of personnel. Stairs allow access to the upper loft, where pipe insulation is stored in bulk on the floor. The exterior pipe insulation has sufficient access for ladders or a manlift. Movement of stored non-ACMs inside the buildings will be significant, and some non-ACMs will require decontamination due to their proximity to ACM and potential cross contamination.

**Abatement Procedures:** Prior to abatement, regulated areas (which may include critical seals) must be established. The abatement of the pipe insulation on the exterior of this building can be accomplished by two methods: Portions that are in good condition and easily accessible could be abated by properly wrapping and cutting in conjunction with glovebagging the remaining portions (Option 1). This option allows the contractor more flexibility in abatement techniques, resulting in some cost benefit. Alternatively, all pipe insulation can be safely abated by glovebagging, leaving all piping systems in place (Option 2). The pipe insulation on the second floor is currently stored as bulk storage in piles and crates. A large portion of the second floor must be cleaned due to the pipe insulation debris on the floor.

### **Stabilization and Abatement Cost Estimates:**

#### **Stabilization Cost Estimate: UPEA, 2004**

Stabilization Item No./Description		Estimated Cost
1.	Patch hole in attic floor	\$ 100.00
2.	OSHA handrail on stairs	\$ 200.00

**Building No. 11 Stabilization Total \$ 300.00**

**Abatement Option 1:** Gross Removal, and Pipe Insulation Wrap and Cut and/or Glovebag

Abatement Description		Estimated Cost
1.	Gross removal and debris cleanup	\$ 3,400.00
2.	Pipe insulation: wrap and cut (portions) and glovebag	\$ 565.00
Option 1 Abatement Estimate		\$ 3,965.00*
Stabilization Estimate		\$ 300.00

**Building No. 11 Option 1 Total \$ 4,265.00\***

**Option 2:** Abatement by Gross Removal, and Pipe Insulation Glovebag Only

Abatement Description		Estimated Cost
1.	Gross removal and debris cleanup	\$ 3,400.00
2.	Pipe insulation: glovebag only	\$ 750.00
Option 2 Abatement Estimate		\$ 4,150.00*
Stabilization Estimate		\$ 300.00

**Building No. 11 Option 2 Total \$ 4,450.00\***

\*- Does not include a cost for mobilization, third-party oversight, structural engineer oversight, or markup for site specific conditions for asbestos abatement.

**4.7 BUILDING NUMBER 14: BRIQUETTING PLANT (1906)**

**Building Description:** This is a 40-foot-by-45-foot three-story concrete masonry structure with heavy timber columns and beams, a gabled roof, and a large dormer on each side of the metal roof. Windows are large, fixed, and industrial in nature with divided lights. The roof is partially collapsed. Large wooden doors are typical of other facility structures and are painted red. The

building is directly connected to the limestone bins to the east and contains rails and turnstyles for tramming bulk materials.

**Required Stabilization Summary:** Portions of this building require stabilization as noted in the UPEA *Structural Stabilization Work for Asbestos Abatement Report* 2004. The stabilization measures include the following:

1. Stabilize settling/failing sections of the floor and columns with temporary steel jack posts on concrete blocking on south half of building;
2. Remove loose and rotted materials on second floor and roof;
3. Provide temporary bracing (struts) to support north wall of building into second floor of south half of building.

**Friable Asbestos Summary (quantities from ATC report):** This building contains pipe insulation and debris in various areas of the interior and the exterior of the building. The first floor contains deteriorated pipe insulation on pipe runs at the ceiling level. ACM debris is present on the floor around each area. The majority of friable ACM is in poor condition. The table below is a summary of the data ATC presented.

<b>Friable ACM Description</b>	<b>Quantity</b>	<b>At Elevation (Y/N)</b>	<b>Debris Below (Y/N)</b>	<b>Comments</b>
Pipe insulation inside and outside building	50 LF	Yes	Yes	Assumed scaffolding or manlift required.

LF = linear feet

SF = square feet

### **Abatement Option Summary**

**Building Layout:** The building access points will allow for movement of personnel. The exterior pipe insulation has sufficient access for ladders or a manlift. Movement of stored non-ACM inside the buildings will be significant, and some non-ACMs will require decontamination due to their proximity to ACM and potential cross contamination.

**Abatement Procedures:** Prior to abatement, regulated areas (which may include critical seals) must be established. The configuration of the existing pipe insulation generally excludes wrapping and cutting; therefore, glovebags can be used exclusively to abate the ACM safely. This leaves the piping systems in place. A portion of the floor will need to be cleaned due to pipe insulation debris on the floor.

**Stabilization and Abatement Cost Estimates:**

**Stabilization Cost Estimate:** UPEA, 2004

Stabilization Item No./Description		Estimated Cost
1.	Stabilize second floor	\$ 22,000.00
2.	Remove loose material 2 <sup>nd</sup> floor	\$ 6,000.00
3.	Temporary north wall bracing	\$ 15,000.00

**Building No. 14 Stabilization Total \$ 43,000.00**

**Abatement Estimate:** Gross Removal, and Pipe Insulation Glove Bag

Abatement Description		Estimated Cost
1.	Gross removal and debris cleanup	\$ 1,000.00
2.	Pipe insulation: wrap and cut (portions) and glovebag	\$ 750.00
Abatement Estimate		\$ 1,750.00*
Stabilization Estimate		\$ 43,000.00

**Building No. 14 Total \$ 44,750.00\***

\*- Does not include a cost for mobilization, third-party oversight, structural engineer oversight, or markup for site specific conditions for asbestos abatement.

#### 4.8 **BUILDING NUMBER 15: CRUSHING PLANT (1919)**

**Building Description:** This is a two-story corrugated-metal-clad addition to the briquetting plant. The roof is partially collapsed. This building was determined to be unsafe for further inspection in December 2004.

**Required Stabilization Summary:** Portions of this building require stabilization as noted in the UPEA *Structural Stabilization Work for Asbestos Abatement Report* (2004). The stabilization measures include the following:

1. Remove any loose material that may fall on workers or impede contractor traffic during asbestos abatement;
2. Open boarded-up door on south wall of building that is used as an emergency exit;
3. Open up door from Building No. 14 on east wall.

**Friable Asbestos Summary (quantities from ATC report):** WESTON's asbestos professional did not conduct a complete review during the December 2004 assessment due to the structural integrity of the building. The table below is a summary of the data ATC presented.

Friable ACM Description	Quantity	At Elevation (Y/N)	Debris Below (Y/N)	Comments
Block insulation	5 SF	Yes	Yes (assumed)	In second floor of building on east wall.

LF = linear feet

SF = square feet

#### **Abatement Option Summary**

**Building Layout:** The building access points will allow for movement of personnel once access to the second floor is secured. It is reported that the friable ACM is located in an opening between rooms.

**Abatement Procedures:** Prior to abatement, regulated areas (which may include critical seals) must be established. It is assumed that gross removal of the block insulation is required, and a small portion of the second floor will need to be cleaned due to block debris on the floor.

**Stabilization and Abatement Cost Estimates:**

**Stabilization Cost Estimate:** UPEA, 2004

Stabilization Item No./Description		Estimated Cost
1.	Remove loose material	\$ 1,500.00
2.	Open up doorway south wall	\$ 1,500.00
3.	Open door to Building No. 14	\$ 150.00

**Building No. 15 Stabilization Total \$ 3,150.00**

**Abatement Estimate:** Abatement by Gross Removal

Abatement Description		Estimated Cost
1.	Gross removal and debris cleanup	\$ 200.00
Abatement Estimate		\$ 200.00*
Stabilization Estimate		\$ 3,150.00

**Building No. 15 Total \$ 3,350.00\***

\*- Does not include a cost for mobilization, third-party oversight, structural engineer oversight, or markup for site specific conditions for asbestos abatement.

#### **4.9 BUILDING NUMBER 16: PUMP HOUSE ADDITION (1906)**

**Building Description:** This is a 40-foot-by-25-foot one-story sandstone addition to the northeast end of the cupola building, which houses the pumps used in the smelting process. Sandstone erosion is evident. Construction is similar to the cupola building with large windows and doors. The roof is corrugated metal and has a gabled end. Penetrations for power supply exist on the north side of the roof.

**Required Stabilization Summary:** Portions of this building require stabilization as noted in the UPEA *Structural Stabilization Work for Asbestos Abatement Report* 2004. The stabilization measures include the following:

1. Provide temporary supplemental pipe support for the two larger-diameter pipes prior to any asbestos abatement. This may be done from the floor or from the roof structure. Leave temporary pipe supports in place after project is complete.

**Friable Asbestos Summary (quantities from ATC report):** This building contains pipe insulation and debris in the interior of the building on a majority of the pump piping. ACM debris is present on the floor around each area. The majority of friable ACM is in poor condition. The table below is a summary of the data presented by ATC.

<b>Friable ACM Description</b>	<b>Quantity</b>	<b>At Elevation (Y/N)</b>	<b>Debris Below (Y/N)</b>	<b>Comments</b>
Pipe insulation (magblock)	225 LF	Yes	Yes	Assumed scaffolding or manlift required. Gross removal in containment.

LF = linear feet

SF = square feet

#### **Abatement Option Summary**

**Building Layout:** The building access points will allow for movement of personnel. The pipe insulation abatement will require ladders or a manlift. Movement of stored non-ACM inside the

buildings will be minimal, and some non-ACM will require decontamination due to their proximity to ACM and potential cross contamination.

**Abatement Procedures:** Prior to abatement, regulated areas (which may include critical seals) must be established. The configuration of the existing pipe insulation and debris generally excludes wrapping and cutting and glovebagging from consideration as methods for abatement; therefore, gross removal of ACM within containment is recommended to safely abate the ACM entirely. This leaves the piping systems in place. The entire floor of the pump house will require cleaning due to the pipe insulation debris on the floor.

#### **Stabilization and Abatement Cost Estimates:**

##### **Stabilization Cost Estimate: UPEA, 2004**

<b>Stabilization Item No./Description</b>		<b>Estimated Cost</b>
1.	Additional support for pipes	\$ 2,000.00

**Building No. 16 Stabilization Total \$ 2,000.00**

##### **Abatement Estimate: Gross Removal**

<b>Abatement Description</b>		<b>Estimated Cost</b>
1.	Gross removal and debris cleanup	\$ 5,000.00
Abatement Estimate		\$ 5,000.00*
Stabilization Estimate		\$ 2,000.00

**Building No. 16 Total \$ 7,000.00\***

\*- Does not include a cost for mobilization, third-party oversight, structural engineer oversight, or markup for site specific conditions for asbestos abatement.

#### **4.10 BUILDING NUMBER 17: CUPOLA BUILDING (1898)**

**Building Description:** This three-story sandstone building is easily identified by two prominent towers that rise above the gabled roofline. These towers contain the hoists for handling materials inside the building. Large, arched window and door openings occur in a regular-spaced pattern around the exterior envelope.

**Required Stabilization Summary:** Portions of this building require stabilization as noted in the *UEPA Structural Stabilization Work for Asbestos Abatement Report (2004)*. The stabilization measures include the following:

1. Temporarily restrict use of the south half of the building for contractor movement and removal of materials;
2. Clear the doorway openings on the west wall of the north room for material removal and movement of contractor personnel. This will require all the stabilization work to be done in Building No. 18 prior to work in Building No. 17;
3. Check pipe supports prior to any asbestos abatement. Provide supplemental pipe support if necessary.

**Friable Asbestos Summary (quantities from ATC report):** This building contains pipe insulation, insulation debris, and valve insulation in the interior of the building on a majority of the process piping. ACM debris is present on the floor around each area. The majority of friable ACM is in poor condition. The table below is a summary of the data ATC presented.

<b>Friable ACM Description</b>	<b>Quantity</b>	<b>At Elevation (Y/N)</b>	<b>Debris Below (Y/N)</b>	<b>Comments</b>
Pipe insulation (aircell) middle of north wall	200 LF	Yes	Yes	Work requires the use of a manlift.
Pipe insulation, 24-inch valve	50 SF	No	No	Gross removal at ground level (mini enclosure).

LF = linear feet

SF = square feet

### **Abatement Option Summary**

**Building Layout:** The building access points will allow for movement of personnel. The exterior pipe insulation has sufficient access for ladders or a manlift. Movement of stored non-ACM inside the buildings will be significant, and some non-ACM will require decontamination due to their proximity to ACM and potential cross contamination.

**Abatement Procedures:** Prior to abatement, regulated areas (which may include critical seals) must be established. The abatement of the pipe insulation in this building can be accomplished by two methods: Portions that are in good condition and easily accessible could be abated by properly wrapping and cutting in conjunction with glovebagging the remaining portions (Option 1). This option allows the contractor more flexibility in abatement techniques, resulting in some cost benefit. Alternatively, all pipe insulation can be safely abated by glovebagging, leaving all piping systems in place (Option 2). The 24-inch valve insulation will require construction of a mini-enclosure. A large portion of the second floor will require cleaning due to the pipe insulation debris on the floor.

### **Stabilization and Abatement Cost Estimates:**

**Stabilization Cost Estimate:** UPEA, 2004

Stabilization Item No./Description		Estimated Cost
1.	Restrict access to south side	\$ 500.00
2.	Clear doorway openings	1,000.00
3.	Supplemental pipe support	\$ 1,000.00

**Building No. 17 Stabilization Total \$ 2,500.00**

**Abatement Option 1:** Abatement by Gross Removal and Pipe Insulation Wrap and Cut and/or Glovebag

Abatement Description		Estimated Cost
1.	Gross removal and debris cleanup	\$ 5,200.00
2.	Pipe insulation: wrap and cut (portions) and glovebag	\$ 2,325.00
Option 1 Abatement Estimate		\$ 7,525.00*
Stabilization Estimate		\$ 2,500.00

**Building No. 17 Option 1 Total \$ 10,025.00\***

**Abatement Option 2:** Abatement by Gross Removal and Pipe Insulation Glovebag Only

Abatement Description		Estimated Cost
1.	Gross removal and debris cleanup	\$ 5,200.00
2.	Pipe insulation: glovebag only	\$ 3,100.00
Option 2 Abatement Estimate		\$ 8,300.00*
Stabilization Estimate		\$ 2,500.00

**Building No. 17 Option 2 Total \$ 10,800.00\***

\*- Does not include a cost for mobilization, third-party oversight, structural engineer oversight, or markup for site specific conditions for asbestos abatement.

**4.11 BUILDING NUMBER 18: BOILER HOUSE (1905)**

**Building Description:** This addition to the sandstone cupola building houses an original boiler for power generation. The building combines masonry walls (where shared between structures) with a corrugated metal exterior. The roof is partially collapsed. The location of the smokestack for the boiler can be seen as a short protrusion from its badly deteriorated roof.

**Required Stabilization Summary:** Portions of this building require stabilization as noted in the UPEA *Structural Stabilization Work for Asbestos Abatement Report* (2004). The stabilization measures include the following:

1. Clear debris in boiler house and pathway for both doorways in Building No. 17;
2. Remove all loose and rusted-through metal roof panels and other overhead debris that may fall;
3. Stabilize the top masonry stone of the east wall, including the window lintel in the southeast corner on the upper floor;
4. Provide temporary bracing for the east and west walls, using adjustable steel struts or similar. These braces shall be left in place after the project is complete;
5. Check pipe supports prior to any debris or asbestos removal beneath them. Provide supplemental pipe support if necessary. Remove pipe if impractical to provide support. Leave additional pipe supports after project completion.

**Friable Asbestos Summary (quantities from ATC report):** This building contains pipe insulation, insulation debris, and valve insulation on a majority of the process piping. ACM debris is present on the floor around each area. The majority of friable ACM is in poor condition. The table below is a summary of the data ATC presented.

Friable ACM Description	Quantity	At Elevation (Y/N)	Debris Below (Y/N)	Comments
Pipe insulation (aircell)	500 LF	Yes	Yes	Assumed scaffolding or manlift required.
Pipe joint insulation	30 LF	Yes	Yes	Assumed scaffolding or manlift required.

LF = linear feet

SF = square feet

### **Abatement Option Summary**

**Building Layout:** The building access points will allow for movement of personnel. The pipe insulation has limited access for ladders or a manlift due to wooden platforms. Movement of

stored non-ACM inside the buildings will be extensive, and some non-ACMs will require decontamination due to their proximity to ACM and potential cross contamination.

**Abatement Procedures:** Prior to abatement, regulated areas (which may include critical seals) must be established. The configuration and condition of the existing pipe insulation generally excludes wrapping and cutting from consideration as methods of abatement; therefore, glovebags can be used to safely abate the ACM entirely. This leaves all piping systems in place. Horizontal surfaces (including floors below piping) will require cleaning due to extensive pipe insulation debris.

#### **Stabilization and Abatement Cost Estimates:**

**Stabilization Cost Estimate:** UPEA, 2004

Stabilization Item No./Description		Estimated Cost
1.	Debris removal	\$ 5,000.00
2.	Remove roof panels	\$ 15,000.00
3.	Stabilize top of masonry	\$ 12,000.00
4.	Temporary wall bracing	\$ 10,000.00
5.	Supplemental pipe support	\$ 7,500.00

**Building No. 18 Stabilization Total \$ 49,500.00**

**Abatement Estimate:** Abatement by Gross Removal and Pipe Insulation Glovebag Only

Abatement Description		Estimated Cost
1.	Gross removal and debris cleanup	\$ 4,000.00
2.	Pipe insulation: wrap and cut (portions) and glovebag	\$ 7,950.00
Abatement Estimate		\$ 11,950.00*
Stabilization Estimate		\$ 49,500.00

**Building No. 18 Total \$ 61,450.00\***

\*- Does not include a cost for mobilization, third-party oversight, structural engineer oversight, or markup for site specific conditions for asbestos abatement.

**4.12 BUILDING NUMBER 19: BADEN HAUSEN BOILER BUILDING**

**Building Description:** This is a two-story poured-concrete building with exterior pilasters and a gabled, corrugated-metal roof. The structure has evenly spaced, large, arched windows.

**Required Stabilization Summary:** Portions of this building require stabilization as noted in the UPEA *Structural Stabilization Work for Asbestos Abatement Report* (2004). The stabilization measures include the following:

1. Remove any loose debris, wood planking from above;
2. Remove all debris on floor for housekeeping purposes so that these materials do not cause tripping or fire hazards during asbestos abatement;
3. Remove and relocate all the spare wooden doors stored in the entry way. Move to dry, secure location on-site.

**Friable Asbestos Summary (quantities from ATC report):** ATC did not complete a survey of this building due to the inaccessibility of the top of the boiler. Quantities are estimated.

Friable ACM Description	Quantity	At Elevation (Y/N)	Debris Below (Y/N)	Comments
Pipe insulation	15 LF	Yes	Yes	Above boiler, quantity estimated due to inaccessibility.

LF = linear feet

SF = square feet

### **Abatement Option Summary**

**Building Layout:** The building access points will allow for movement of personnel. The pipe insulation has limited access for ladders or a manlift due to a large boiler. Movement of stored non-ACM inside the buildings will be extensive, and some non-ACM will require decontamination due to their proximity to ACM and potential cross contamination.

**Abatement Procedures:** Prior to abatement, regulated areas (which may include critical seals) must be established. It is assumed that the configuration of the existing pipe insulation generally excludes wrapping and cutting as methods of abatement in this building; therefore, glovebags can be used to safely abate the ACM entirely. This leaves all piping systems in place. The top of the boiler's horizontal surface below the piping will require cleaning due to possible pipe insulation debris.

### **Stabilization and Abatement Cost Estimates:**

**Stabilization Cost Estimate:** UPEA, 2004

Stabilization Item No./Description		Estimated Cost
1.	Remove loose debris above	\$ 2,500.00
2.	Remove floor debris	\$ 2,000.00
3.	Move stored material at entry	\$ 1,000.00

**Building No. 19 Stabilization Total \$ 5,500.00**

**Abatement Estimate:** Abatement by Gross Removal and Pipe Insulation by Glovebag

Abatement Description		Estimated Cost
1.	Gross removal and debris cleanup	\$ 300.00
2.	Pipe insulation: glovebag	\$ 1,000.00
Abatement Total		\$ 1,300.00*
Stabilization Total		\$ 5,500.00

Building No. 19 Total \$ **6,800.00\***

\*- Does not include a cost for mobilization, third-party oversight, structural engineer oversight, or markup for site specific conditions for asbestos abatement.

**4.13 BUILDING NUMBER 20: MACHINE SHOP (1907)**

**Building Description:** This is a single-story concrete-masonry building with a saltbox-style metal roof. Design features include jack arches above the large windows and oversized double doors. Circular windows below the gable ends of the roof provide ornamentation and light inside.

**Required Stabilization Summary:** Portions of this building require stabilization as noted in the UPEA *Structural Stabilization Work for Asbestos Abatement Report* (2004). The stabilization measures include the following:

1. Check and patch/brace chimney above roof on northwest side of building.

**Friable Asbestos Summary (quantities from ATC report):** This building contains pipe insulation and friable ACM paper in the loft of the building. ACM debris is present on the floor around each area. The majority of friable ACM is in fair condition. The table below is a summary of the data ATC presented.

Friable ACM Description	Quantity	At Elevation (Y/N)	Debris Below (Y/N)	Comments
Asbestos Paper	50 SF	No	Yes	Gross removal of roll of ACM paper.
Pipe insulation (magblock)	50 LF	No	Yes	On second floor loft area.

LF = linear feet

SF = square feet

### **Abatement Option Summary**

**Building Layout:** The building access points will allow for movement of personnel. The pipe insulation is at waist level. Movement of stored non-ACM inside the buildings will be minimal, and some non-ACM will require decontamination due to their proximity to ACM and potential cross contamination.

**Abatement Procedures:** Prior to abatement, regulated areas (which may include critical seals) must be established. The configuration of the existing pipe insulation generally excludes wrapping and cutting as methods for abatement; therefore, glovebags can be used to safely abate the ACM entirely. This leaves all piping systems in place. The asbestos paper is in a roll and is stored in the northeast corner of the loft. The floor surface below the piping and in the area of the ACM paper will require HEPA cleaning.

### **Stabilization and Abatement Cost Estimates:**

**Stabilization Cost Estimate:** UPEA, 2004

Stabilization Item No./Description		Estimated Cost
1.	Check/patch/brace chimney	\$ 500.00

**Building No. 20 Stabilization Total \$ 500.00**

**Abatement Estimate:** Abatement by Gross Removal and Pipe Insulation Wrap by Glovebag

Abatement Description		Estimated Cost
1.	Gross removal and debris cleanup	\$ 500.00
2.	Pipe insulation: wrap and cut (portions) and glovebag	\$ 500.00
Abatement Estimate		\$ 1,000.00*
Stabilization Estimate		\$ 500.00

**Building No. 20 Total \$ 1,500.00\***

\*- Does not include a cost for mobilization, third-party oversight, structural engineer oversight, or markup for site specific conditions for asbestos abatement.

**4.14 BUILDING 25: BARN (1898)**

**Building Description:** This 1.5-story timber-frame board-and-batten barn has a poured-concrete floor and a corrugated-metal gable roof. Large double doors on the west wall appear to accommodate horses and items drawn behind horses. The south wall has small, square windows on a block for hoisting feed to the upper level for storage. The north wall features small, divided light windows at the lower level.

**Required Stabilization Summary:** Portions of this building require stabilization as noted in the UPEA *Structural Stabilization Work for Asbestos Abatement Report* (2004). The stabilization measures include the following:

1. Check cables attached to north walls use to brace the swaying Building No. 26 to the north. Monitor these cables and remove them if they are affecting the lateral stability of this Building No. 25. Brace Building No. 26 independently on its own north side.

**Friable Asbestos Summary (quantities from ATC report):** This building contains pipe insulation. ACM debris is present on the floor around each area. The majority of friable ACM is in fair condition.

<b>Friable ACM Description</b>	<b>Quantity</b>	<b>At Elevation (Y/N)</b>	<b>Debris Below (Y/N)</b>	<b>Comments</b>
Pipe insulation	100 LF	Yes	Yes	Interior and exterior pipe insulation can be accessed by ladders or lifts.

LF = linear feet

SF = square feet

### **Abatement Option Summary**

**Building Layout:** The building access will allow for movement of personnel. The pipe insulation will require the use of ladders or lifts. Movement of stored non-ACM inside the buildings will be minimal, and some non-ACM will require decontamination due to their proximity to ACM and potential cross contamination.

**Abatement Procedures:** Prior to abatement, regulated areas (which may include critical seals) must be established. The abatement of the pipe insulation in this building can be accomplished by two methods: Portions that are in good condition and easily accessible can be abated by properly wrapping and cutting in conjunction with glovebagging the remaining portions. Alternatively, all pipe insulation can be safely abated by glovebagging. This leaves all piping systems in place. The floor surface below the piping may require cleaning.

## Stabilization and Abatement Cost Estimates:

### Stabilization Cost Estimate: UPEA, 2004

Stabilization Item No./Description		Estimated Cost
1.	Sway bracing relocation	\$ 1,500.00

**Building No. Stabilization Total \$ 1,500.00**

**Abatement Option 1:** Abatement by Gross Removal, and Pipe Insulation Wrap and Cut and/or Glovebag

Abatement Description		Estimated Cost
1.	Pipe insulation: wrap and cut (portions) and glovebag	\$ 1,000.00
Option 1 Abatement Estimate		\$ 1,000.00*
Stabilization Estimate		\$ 1,500.00

**Building No. 25 Option 1 Total \$ 2,500.00\***

**Abatement Option 2:** Abatement by Gross Removal and Pipe Insulation by Glovebag Only

Abatement Description		Estimated Cost
1.	Pipe insulation: glovebag only	\$ 1,500.00
Option 2 Abatement Estimate		\$ 1,500.00*
Stabilization Estimate		\$ 1,500.00

**Building No. 25 Option 2 Total \$ 3,000.00\***

\*- Does not include a cost for mobilization, third-party oversight, structural engineer oversight, or markup for site specific conditions for asbestos abatement.

#### **4.15 COST SUMMARY**

The difference between treatment options for the smokestack has the greatest impact on project costs. Cost estimates for addressing the stabilization of the smokestack range from \$24,360 for guy wire replacement to \$364,420 for total historical restoration. Demolition of the stack is estimated at between \$64,005 and \$170,000, depending on the type of action performed.

Required stabilization of buildings containing friable ACM (excluding the smokestack) is estimated to cost approximately \$199,250, including removal of loose railroad ties/rails from the railroad trestle.

Asbestos abatement costs range from \$84,099.80 for Option 1, which allows for some wrapping and cutting of pipe insulation, to \$86,885.00 for Option 2, which would not allow wrapping and cutting.

## SECTION 5

### ASBESTOS ABATEMENT COST ESTIMATE ASSUMPTIONS

Cost estimates for the abatement of friable asbestos at the Quincy Smelter Site are presented in Appendix G. The following assumptions were made before preparing the estimates:

- Before any of the building stabilization and abatement activities are implemented, both structural stabilization evaluations produced for the site (Appendices B and C) should be reviewed. The final stabilization plan should consider the precautions both UPEA and Metcalf and Eddy presented.
- It is assumed that the stabilization measures recommended in each of the stabilization plans will be instituted prior to asbestos abatement. No additional costs for stabilization were included in the abatement cost estimate.
- Costs associated with using glovebags and some wrap and cut as presented in the abatement cost estimating worksheets include adjusted pipe insulation pricing assuming some wrap-and-cut abatement. Costs associated with using glovebags only (Appendix G) assume all pipe insulation that is not removed by gross removal will be glovebagged.
- Abatement costs presented in this report include abatement of only the identified, friable ACM on-site and cleanup of ACM debris directly related to these materials.
- Costs presented for all abatement options are estimated to include all materials for abatement, including proper disposal.
- Because many variable and unknown site conditions exist, a 10% cost markup on standard abatement costs was estimated and added to the total abatement costs.
- Labor costs were estimated based on current industry standards of performance and prevailing metropolitan labor wage rates. An adjustment for differences in labor wage rates in Houghton County, Michigan, may be necessary to estimate the abatement cost accurately.

## **SECTION 6**

### **REFERENCES**

ATC Associates, Inc., Asbestos Survey Report, Quincy Smelter Facility, June 2004.

Franklin Township and Keweenaw National Historical Park, Critical Safety and Preservation Needs Assessment, Quincy Mining Company Smelting Works, February 2003.

Franklin Township and Keweenaw National Historical Park, Stabilization Plan, Quincy Mining Company Smelting Works, February 2003.

Martin and Archimede, The Quincy Mining Company Smelting Works, 1898, Historical Land Use Survey Project, 2002.

**APPENDIX A**  
**SITE LAYOUT MAP**

## **APPENDIX B**

### **U.P. ENGINEERS AND ARCHITECTS STABILIZATION REPORT (2004)**

## **APPENDIX C**

### **METCALF & EDDY STABILIZATION REPORT (2004)**

**APPENDIX D**

**TABLE 24 FROM THE ATC ASSOCIATES, INC., ASBESTOS SURVEY REPORT FOR  
THE QUINCY MINING COMPANY SMELTER SITE (2004)**

## **APPENDIX E**

### **PREVIOUSLY DOCUMENTED SITE CONDITIONS**

## **APPENDIX F**

### **SELECTED SITE PHOTO LOG**

## **APPENDIX G**

### **ABATEMENT COST ESTIMATING WORKSHEETS**