Wonder Makers
Environmental, Inc.

ENVIRONMENTAL MONITORING REPORT

Building Inspection for Asbestos

at

Michigan State University, Shaw Hall
East Lansing, MI 48824

November and December 2000

Project #AI00-3137

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Table of Contents

Introduction

Certification

Background Information

General Inspection Procedures

Results of Visual Inspection

Bulk Sample Results

Summary of Asbestos and Lead in Paint Conditions

Asbestos/Lead Control Recommendations

Conclusion

Appendices

A. Sample Collection Log

B. Asbestos Bulk Sample Analysis Report

C. Summary of Asbestos-Containing Material

D. Lead in Paint Analysis Report

E. Diagrams

F. Photograph Log

ASBESTOS INSPECTION REPORT
for
Shaw Hall, Michigan State University
AI00-3137

Introduction

Wonder Makers Environmental was retained by Michigan State University to perform an asbestos inspection at Shaw Hall to identify and document asbestos-containing materials (ACM) in the building prior to the start of renovation activities. In addition to the full asbestos inspection, an overview survey of the main types and colors of paint to determine lead content was conducted in conjunction with the asbestos inspection. The details of the inspection scope and schedule were discussed with Dan Klann and Greg Houghtaling of the physical plant. Specific information regarding the proposed scope of work was provided by Scott Allen of the SmithGroup, who is serving as the primary architect for the project. Ken Hoffman (facilities manager) and Carol Node were the primary contacts at the building and provided escorts for the inspectors during the various investigative activities.

The physical inspection of the facility took place in November and December of 2000. Follow-up site visits were completed in January and February of 2001. In conjunction with the physical inspection, bulk samples were collected and analyzed. This report incorporates information collected by Wonder Makers Environmental prior to the site visit and during the inspection conducted on the date noted above. Additional information was garnered from the sample results as determined after the inspection, and comments made by the occupants, the building staff, the architects, and the MSU project representatives in conjunction with the site visit. Information gathered from this inspection report was utilized to develop abatement specifications released in conjunction with the general renovation plans and specifications for the project. The abatement portion of the specifications can be found as Wonder Makers Environmental project #SF00-3201.

Certification

The initial review of the building, coordination with the architects, review of the inspection, and the development of the specifications was completed by Michael A. Pinto, Ph.D., CSP. Dr. Pinto has a number of technical qualifications including asbestos inspector, management planner, contractor/supervisor, project designer, and certified safety professional. The primary physical inspection of the building and collection of samples was conducted by David T. Woods, whose technical qualifications include certification as an asbestos inspector, certification as an asbestos management

planner, certification as an asbestos abatement supervisor, certification as an asbestos project designer, and others. All samples were analyzed by David Woods and David Batts, who are certified to analyze air samples following the NIOSH 7400 method and to analyze asbestos bulk samples by means of polarized light microscopy. Their bulk sample training is from the McCrone Institute, where they have successfully completed the course on polarized light microscopy.

Background Information

Exposure to airborne asbestos fibers has been shown to cause a number of serious and/or fatal illnesses in humans. Because of this, asbestos-containing materials (ACM) are highly regulated by federal, state, and local agencies. These agencies have determined various limits of exposure that are acceptable (*i.e.*, OSHA Permissible Exposure Limit of 0.1 fibers per cubic centimeter of air [f/cc], MIOSHA clearance level of 0.05 f/cc, EPA Recommended Clean Air Value of 0.01 f/cc, etc.). In order to keep exposure below recommended limits, strict guidelines are enforced for the handling of asbestos; not only if exposure to airborne fiber levels of asbestos exceeds the various limits, but also if ACM is handled or disturbed during renovation or demolition activities.

Liability concerns based on extensive legal action involving asbestos products have also contributed to the increased interest in handling asbestos properly. However, contrary to common belief, the mere presence of asbestos does not necessarily require the removal of the ACM. Other options, such as enclosure, encapsulation, repair, and/or periodic surveillance of intact products, are recognized by the EPA as acceptable options, depending on the specific circumstances of the facility.

The hazard posed by an asbestos-containing product is not only based on its asbestos content, but also on the likelihood that it will release fibers into the air. Because of this, the EPA has developed the term "friable" to identify those materials that can be crumbled, crushed, or pulverized by hand pressure when dry. Friable asbestos-containing material poses a greater risk than non-friable asbestos products. In addition, the EPA definition of asbestos-containing materials only includes those items with more than one percent asbestos.

Although asbestos has been found as a component of over 4,000 different products, the initial review of Shaw Hall indicated only a small number that would be of specific concern.

A brief description of the major classes of products reviewed at every site follows:

Aircell pipe insulation is composed of asbestos paper corrugated into half-round sections that are placed over the top and bottom of a pipe. The aircell insulation

may be held in place with a canvas cover, metal bands, wire, or tape. Because it is easily damaged and has a high asbestos content (35 to 90 percent), aircell is considered very dangerous when disturbed.

asbestos paper was often used to insulate air ducts and foundation walls. It normally consists of over 90 percent asbestos.

ceiling tiles of either a drop-in format or glue-on style have been known to contain asbestos. Some fire-rated tiles have been found to contain up to 20 percent asbestos.

cellulose pipe insulation, sometimes referred to as "woolfelt", is composed of a large number of tightly wrapped sheets of paper that create an effect similar to a roll of paper towels. Very little of the actual cellulose material has ever been detected with an asbestos content. However, many times cellulose pipe insulation will have an asbestos-containing tarpaper layer as the inner wrap or high-percentage asbestos paper as the outer or inner layer.

drywall and patching compounds were often manufactured with an asbestos additive as a binder.

electrical cables or wires were often insulated with asbestos, especially if the wires carried high voltage or were used in hot equipment, such as stage lights or heaters.

fire doors can have asbestos insulation as a core.

fireproofing was often sprayed or tamped on the structural membranes of a building. Asbestos content ranges from more than 1 to 95 percent, depending on the binder used. Such fireproofing may be light and fluffy or hard and dense.

fire resistant wallboard, containing 50 to 80 percent asbestos was often used as a fire barrier around furnaces, stoves, chimneys, and other hot items.

floor tile many times contains asbestos as a binder. While asbestos may be a component of any size or shape tile, the nine-inch by nine-inch square tiles installed between 1930 and 1988 often contain asbestos. Many tile mastics and flexible baseboards have asbestos as a component.

furnace brick is a light tan to dark brown material used to line the inside of furnaces, boilers, kilns, chimneys, and other heating devices. It ranges from a soft and light consistency to heavy, dense material with a smooth texture. Asbestos content of furnace brick ranges from 0 to 60 percent.

gasket materials, particularly those used in high temperature applications, often contain asbestos. Their color ranges from gray to brown with consistency from smooth and flat to braided and flexible.

magnesium silicate insulation is sometimes referred to as "mag". This versatile insulation usually contains between 15 and 50 percent asbestos. It is generally found as a white chalk-like material that has been formed into batts, blocks, half rounds for pipes, or bricks.

pipe fitting insulation or compound is often referred to as "mud." It is applied in a wet state around elbows, T's, reducers, etc., and allowed to dry. It may be covered with a canvas outer wrap or left bare. Asbestos mud was manufactured with 20 to 100 percent asbestos. It can be found applied in conjunction with asbestos or non-asbestos pipe insulation.

insulation finish coats are similar to "mud" discussed above, but are applied to boiler, duct, tank, and breaching insulation to give it a smooth appearance. It was typically applied over mag block, aircell, fiberglass, mineral wool, or chicken wire, and covered with canvas. This material can contain from more than 1 to 50 percent asbestos.

loose-fill insulation was often dumped, blown, or sprayed in place. Most often, rock wool or mineral wool was used for this purpose, but numerous asbestos cases have been documented. This material can contain from more than 1 to 25 percent asbestos.

plaster has been found with asbestos content of 2 to 25 percent. It was both spray- and trowel-applied. Asbestos plaster can have a smooth, granular, hard, or soft texture. Decorative plaster is often found with asbestos, which helped hold together the intricate patterns.

powerhouse cement is the name given to non-asbestos fitting compounds. It is often used in conjunction with fiberglass pipe insulation and looks similar to asbestos "mud".

tarpaper roofing felts and shingles often contain asbestos fibers as a binder. The addition of 5 to 25 percent asbestos was often used to give the asphalt flexibility, strength, and ultraviolet resistance.

textiles woven from asbestos were used as expansion joints for ducts, fire blankets, flame resistant clothing, curtains, cords, and felts. Asbestos content is 50 to 100 percent.

textured and reflective paint often had asbestos added to produce thickness.

transite is the name given to products that are made from asbestos-containing cement. Transite is most commonly found as large diameter pipes, building siding, roof decks, tabletops, fume hoods, and oven insulation. Transite usually contains 10 to 50 percent asbestos.

underlayment used with tile or linoleum often contains asbestos.

General Inspection Procedures

In an effort to determine if there was a hazard posed by asbestos products in Shaw Hall, an extensive inspection procedure was followed. A visual inspection of the entire facility was matched with the collection of an appropriate number and distribution of bulk samples. After reviewing the general layout, a visual inspection of the entire building was completed. This included all floors, storage rooms, crawlspaces, and roofs. Access was provided to all areas of the site. The determination of the number and placement of samples of suspect materials was made in compliance with current acceptable industry standards and the minimum requirements as laid out in EPA and OSHA regulations. Each individual area where a sample was collected was coded on the diagram with a number. Any bulk samples that were collected as part of this inspection were coded 3137-xx. (xx stands for a sequential two-digit numerical code.)

Determination of suspect asbestos-containing products was based on visual evidence, bulk sample analysis, age of the material, and professional experience. All bulk samples of friable materials were collected using wet methods and coring tools. Several items that were observed by the inspector were immediately determined to be non-asbestos. These included: fiberglass pipe insulation, foam rubber pipe insulation, fiberglass batt insulation, and rubber vibration gaskets on HVAC equipment.

Attempts were made to collect mastic samples from the floor tile, although this was not possible in all cases in order to avoid significant or obvious damage to the flooring. In cases where floor tile mastic was collected in great enough quantities to be analyzed separately, the results are shown on the bulk sample analysis report. In all cases where floor tile was found to be an asbestos-containing material, the mastic is considered to be asbestos-containing as well.

Since the building was occupied during the site investigation, destructive testing (*i.e.*, demolition) was not conducted as part of this asbestos building inspection. As such, quantities of ACM shown in chases or behind plaster surfaces have been estimated. Additionally, some asbestos-containing material hidden from view may be present and may not have been accounted for as part of this inspection.

The overview survey for lead in paint included significant discussions with the facility manager regarding the painting history in the building. During these discussions it was determined that the majority of the paints used in the building were latex (i.e.

waterbased pigment) and therefore less likely to be lead-containing. Each major color and type of paint (walls, trim, guardrails, etc.) was sampled to help confirm the information received from the facility manager. Paint chip samples were collected of all of the layers on a particular item, sealed in individual vials, labeled and sent to METS Laboratory with an appropriate chain of custody for analysis.

Results of Visual Inspection

Based on the initial inspection of the building, thirteen separate suspect asbestos-containing materials were identified. Some suspect asbestos-containing materials were sampled a number of times in different locations, including smooth plaster, textured plaster, pipe insulation, ceiling tiles, floor tile, and cove molding. All suspect asbestos-containing materials observed at the time of the inspection are listed in the summary of asbestos-containing materials and forms. Information from lab analysis is incorporated into the bulk sample log for ease in interpreting the report.

The condition of the suspect asbestos-containing materials observed in the building was uniformly good. Some areas where specific damage was identified included the west fourth floor mechanical room and the water softener room. Significant evidence revealed an on-going maintenance program for the asbestos in the building. In addition to the absence of damaged material and debris, appropriate asbestos signage on the maintenance and tunnel entrances were observed as well as many locations throughout the building, where pipe insulation or other materials had been repaired/encapsulated in the past. The few areas where minor damage or debris was identified were communicated to the building representatives at the time of the inspection for appropriate response by trained MSU personnel.

Bulk Sample Results

The information gathered from the collection and analysis of bulk samples by Wonder Makers Environmental personnel is shown in Appendices A (sample collection log) and B (lab analysis report). The bulk sampling log and the lab analysis reports give a description of each material, location where it was collected, and analysis results. The approximate location of each bulk sample is noted on the diagram with the two-digit sample number. Location of paint chip samples are also shown on the diagram. Sample results for the paint chips are included in appendix D, the lead in paint analysis report.

Summary of Asbestos and Lead in Paint Conditions

A number of asbestos-containing materials were identified at Shaw Hall. These include:

- pipe and fitting insulation on low-pressure and high pressure steam lines
- pipe and fitting insulation on domestic hot and cold water lines
- pipe and fitting insulation on condensate return lines
- textured plaster ceilings in the hallways in common areas with the exception of the second floor hallways ceilings
- insulation on the hot water holding tanks in the mechanical rooms
- nine inch by nine inch floor tile of various colors found throughout the building but primarily in the a dorm rooms and in the hallways under the carpet
- black cove molding in the dorm rooms and hallways.

While confirming that many materials were asbestos-containing, the inspection was also successful in identifying a number of suspect materials that do not contain asbestos. These non-asbestos materials include:

- Smooth plaster
- 12" x 12" glue-on ceiling tiles in the dining rooms
- 12" x 12" brown floor tile
- 9" x 9" glue-on ceiling tile
- new textured plaster in the second floor hallways

Some materials could not be adequately sampled without significant destructive activities. As such, these items are assumed to contain asbestos. This includes roofing materials, fire doors, and glue pods underneath the 12" x 12" and 9" x 9" ceiling tiles. **Based on experience with similar buildings on the MSU campus, there may be a layer of asbestos waterproofing material below the ceramic tile on the floor of the student bathrooms.**

The following general estimates were made of quantities of asbestos-containing materials in the building. A number of these materials are going to be impacted during the planned renovations of the bathrooms and installation of the fire protection equipment. The following quantities are rough estimates completed during the investigation along with estimates of the amount of material that will be impacted during the renovation.

- Textured ceiling plaster -- 32,000 square feet (24,000 sq.ft.)
- Floor tile -- 56,000 square feet (3,000 sq. ft.)
- Pipe and fitting insulation -- 19,000 linear feet (7,000 lf)
- Fabric-style HVAC vibration gaskets -- 200 square feet (100 sq. ft.)

The results of the paint chip samples showed that only one structural component in the building had paint with a lead content high enough to be considered lead based paint. Paint chip samples collected from the metal handrails in various stairwells showed that these items have a lead content which exceeds the federal guidelines of 0.5% lead and therefore warrants special precautions during work activities.

Asbestos/Lead Control Recommendations

Based on the information gathered during this asbestos inspection, the following prioritized recommendations are offered. These recommendations may have to be adjusted if change of ownership, emergency, or other factors substantially alter the condition or use of the building.

1. Incorporate the information garnered from this inspection report into specific abatement specifications to be provided to bidders interested in the plan to renovate the bathrooms and other areas of the building. In this way the building owners can plan for the proper removal of any asbestos-containing materials prior to renovation or demolition of the facility.

2. As non-destructive survey techniques were utilized during the inspection, there is a possibility that suspect asbestos-containing materials could be hidden behind walls, above ceilings, or in other inaccessible locations. Building personnel, bidders, and the selected contractors should be informed of this possibility and instructed to contact the project representative if any such materials are discovered during renovation or maintenance activities. Follow-up sampling and analysis can be provided by Wonder Makers Environmental on an emergency basis in such instances.

3. Core sampling of the roofing materials and bathrooms floors should be conducted at the beginning of the renovation process after occupants have been removed from the building. The purpose of the sampling is to determine whether roof plies or flashings and/or the waterproofing underneath the bathroom floor ceramic tile contain asbestos. Any positive results from the asbestos sampling should be incorporated into the construction process.

4. Building maintenance personnel and renovation contractors should be informed of the presence of paints that contain lead in the building. Such individuals should be instructed to minimize disturbance of such paints, particularly with power tools or cutting torches to avoid creating airborne exposure that would create a hazard or constitute a violation of the MIOSHA standards.

5. The cost associated with the abatement detailed in the specifications provided to Michigan State University are estimated at approximately $375,000. This includes an estimate for the abatement cost (i.e. $300,000-$325,000) as well as the cost of the associated air monitoring and project management (i.e. $50,000-$75,000) which is managed by the University under separate contract.

Conclusion

This facility inspection to determine the location of asbestos-containing products was conducted in accordance with the appropriate laws and current industry standards.

For additional information, please contact Wonder Makers Environmental at P.O. Box 50209, Kalamazoo, Michigan 49005-0209, phone (616) 382-4154, fax (616) 382-4161.

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