February 12, 1997

REPORT: Full Building Survey

TO: Tim Nelson, Facilities Management's Asbestos Coordinator, 400 Donhowe Building
    Bill Chose, Facilities Management's Zone 1 Manager, 202 Facilities Management Building

FROM: Bryan Angstman, Asbestos Group, Environmental Health and Safety, W-140 Boynton Health Service, 410 Church Street, S.E., Minneapolis, MN 55455

SUBJECT: Asbestos Material Survey - Greenhouse
    EH&S Project No: 370-96-071
    EH&S Project No: 370K-96-136
    Client Project No: for database

Scope of Work: A full building asbestos material survey was conducted on July 29, 1996 through August 16, 1996. The purpose of the survey was to identify asbestos-containing materials (ACM) as defined by the Environmental Protection Agency (EPA), the Occupational Health & Safety Administration (OSHA), and the Minnesota Department of Health (MDH). Any material that is greater than 1% asbestos is considered to be ACM. The intent of the survey was to identify both friable and non-friable suspect ACM, identify non-friable ACM that may become friable under demolition or renovation conditions, and to provide approximate cost estimates for the removal of identified ACM in the Greenhouse.

Project Description: One hundred nineteen (119) bulk samples of suspect ACM were collected on-site and one hundred eleven (111) were analyzed via polarized light microscopy (PLM) by the Department of Environmental Health & Safety's Asbestos Laboratory for asbestos content. Results of analyses are listed in Appendix I of this report. Appendix I is formatted to provide a room by room inventory of suspect ACM, the asbestos content of each material listed, and friability. An explanation of the tables and abbreviations used in the tables is included with Appendix I. Appendix II is a room by room listing of only those suspect materials that tested >1% asbestos. Minnesota Department of Health (MDH) Asbestos Rules regulate only friable ACM (material may be reduced to powder or dust under hand pressure) while the EPA regulates ACM that may become friable under demolition or renovation conditions.

The following friable or potentially friable materials tested positive as ACM in the North Greenhouse:
<4" white fibrous pipe insulation (PI)(1)
<4" pipe fitting insulation (PFI) on white fibrous line (2)
<4" fibrous PFI on FG w/tar line (8)
4"-8" white fibrous PI (11)
4"-8" PFI on white fibrous line (12)
9"-14" white fibrous PI (21)
9"-14" PFI on white fibrous line (22)
white fibrous tank (32)
sink undercoating (100)
transite (101)
brown putty (102)

The following friable or potentially friable materials tested positive as ACM in the South Greenhouse:

<4" white fibrous pipe insulation (PI)(1)
<4" pipe fitting insulation (PFI) on white fibrous line (2)
<4" felt w/tar PI (5)
<4" fibrous PFI on felt (6)
<4" fibrous PFI on FG w/tar line (8)
<4" fibrous PFI on FG line (10)
4"-8" white fibrous PI (11)
4"-8" PFI on white fibrous line (12)
white fibrous tank (32)
9"x9" grey & white FT (41)
floor tile adhesive (41.5)
transite (101)

The following suspect materials tested none detected (ND) as ACM in the North Greenhouse:

<4" fiberglass PI w/tar (7)
4"-8" fiberglass PI (19)
4"-8" PFI on FG line (20)
foam PI (25)
black tar PI wrap(27)
<4" fiberglass PI (28)
fiberglass duct insulation (31)
concrete block mortar (38)
baseboard adhesive (40)
canvas vibration joint (95)
black lab top (98)
black lab sink (99)

The following suspect materials tested none detected (ND) as ACM in the South Greenhouse:

<4" fiberglass PI w/tar (7)
<4" fiberglass PI (9)
foam PI (25)
foam PI w/canvas wrap(26)
black tar PI wrap(27)
• fiberglass tank (30)
• fiberglass duct insulation (31)
• ceiling plaster (34)
• wall plaster (35)
• clay tile mortar (37)
• concrete block mortar (38)
• sheetrock & taping compound (39)
• 12"x12" white fissured CT (80)
• black lab top (98)
• black lab sink (99)
• floor tar (103)

The following suspect materials tested none detected (ND) as ACM in the 370K Greenhouse building:

• <4" fiberglass PI (9)
• <4" fibrous PFI on FG line (10)
• 4"-8" fiberglass PI (19)
• 4"-8" PFI on FG line (20)

The following non-friable, with low potential to become friable, material tested <1% ACM in the North Greenhouse:

• sheetrock & taping compound (39)

For room locations of above noted materials, refer to Appendices. Sample numbers of the above materials are located in the parenthesis following the sample descriptions.

Observations and Recommendations:

1.0 Department of Environmental Health & Safety (DEHS):

Please refer to condition assessments for specific damaged areas. In general, materials were found to be in good shape and do not pose significant health concerns to the building occupants.

2.0 Facilities Management:

Please refer to the floor plans included with this report for room numbers. The floor plans indicate the room numbers used in this survey.

All quantities in this survey are estimations and should not be considered exact measurements when used on abatement bids.

Although no roof sampling was done, complete roof sampling is recommended at a time when a qualified roofing contractor is on-site to patch core sample holes in roofing, or prior to roof removal or demolition.
In the Appendices, material descriptions followed by a date refer to samples referenced from previous surveys conducted by Delta Environmental Consultants or by the Department of Environmental Health & Safety. The date refers to the original sampling date.

3.0 General:

The planting tables are included in the transite estimations. If the planting tables are disassembled, they need to be done so in a fashion meeting all OSHA and MDH guidelines.

Due to limited access points in the ceilings and walls, the quantities listed reflect the visibility available at the time of the survey.

**Cost Information:** The approximate cost for the removal of all ACM is itemized below. These figures are based on the assumption that all friable and potentially friable ACM are going to be removed. For project specific removal costs, contact this office with your project requirements and unit costs can be calculated for the impacted areas.

### Greenhouse North Cost Estimation

<table>
<thead>
<tr>
<th>MATERIAL TYPE</th>
<th>LOW RANGE</th>
<th>HIGH RANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>• thermal system insulation</td>
<td>$221,174</td>
<td>$279,618</td>
</tr>
<tr>
<td>• transite</td>
<td>$36,960</td>
<td>$55,440</td>
</tr>
<tr>
<td>• Misc.</td>
<td>$944</td>
<td>$1,838</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>$259,078</td>
<td>$336,896</td>
</tr>
</tbody>
</table>

### Greenhouse South Cost Estimation

<table>
<thead>
<tr>
<th>MATERIAL TYPE</th>
<th>LOW RANGE</th>
<th>HIGH RANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>• thermal system insulation</td>
<td>$99,217</td>
<td>$127,041</td>
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<tr>
<td>• transite</td>
<td>$38,625</td>
<td>$57,938</td>
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<tr>
<td>• Misc.</td>
<td>$570</td>
<td>$1,130</td>
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<tr>
<td><strong>TOTAL</strong></td>
<td>$138,412</td>
<td>$186,109</td>
</tr>
</tbody>
</table>

All ACM removal must be performed by a Minnesota licensed asbestos abatement contractor. All asbestos removal shall be performed within the specified procedures as outlined in the **University of Minnesota Technical Specification for Asbestos Abatement.** Please note that removal costs are highly variable and dependent on such factors as contractor availability, accessibility of work areas and site specific work plans.

Air monitoring is required for many asbestos-related projects. Environmental Health and Safety (EH&S) is available to provide this service. The estimated cost for EH&S to complete air monitoring requirements for specific projects will be made available upon request. The cost of air monitoring is a function of contractor on-site days and may vary dependent upon project specific scope of work. EH&S will provide labor, equipment and project oversight as necessary.
Project management and contract administration will be provided by the Facilities Management Project Development Group.

EH&S also recommends that throughout the general renovation activities associated with this building, precautions and work practices should be implemented to minimize nuisance dust levels. Dust suppression techniques (misting the air with water and keeping materials wet) should be required of the general contractor.

At the time of renovation and/or demolition, any areas where contained abatement would need to be performed and those areas not having been accessed during this survey should be entered and surveyed by certified personnel. In the case this may constitute an uncontrolled abatement procedure DEHS would suggest nine samples of surfacing materials and at least three of thermal or miscellaneous materials be taken and analyzed to be considered non-asbestos containing material in accordance with OSHA regulations.

In accordance with OSHA regulations, areas which contain asbestos materials are required to be labeled at the access points (i.e. the outside of mechanical rooms, etc.)

If there is any further information required, or other questions arise regarding this request, please contact Bryan Angstman at 626-2328.

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