

LIMITED-SCOPE ASBESTOS SURVEY REPORT

Minneapolis Public Housing Authority
1314 44th Avenue North (Hamilton Manor)
Minneapolis, Minnesota

Angstrom No.00-0720



Prepared by:

Angstrom Analytical Inc.
12203 Princeton Avenue
Eden Prairie
MN 55347
(612) 941-4805

July 20th, 2000

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LIMITED-SCOPE ASBESTOS SURVEY REPORT

**Minneapolis Public Housing Authority
1314 44th Avenue North (Hamilton Manor)
Minneapolis, Minnesota
Angstrom No. 00-0720**

1.0 Introduction

1.1 Purpose

Angstrom Analytical Inc. (Angstrom), was contracted to perform a survey for asbestos-containing materials (ACM) for the Minneapolis Public Housing Authority at 1314 44th Avenue North (Hamilton Manor) in Minneapolis, Minnesota. The purpose of the survey was to identify and assess *accessible* materials that contain asbestos so as to provide an overall survey and inventory of *accessible* ACM. Angstrom's services were requested by Mr. Michael H. Barrowclough, Central Heating Chief Engineer, Minneapolis Public Housing Authority.

1.2 Scope of Work

From 6/23/00 to 7/6/00, MN licensed asbestos inspectors as representatives of Angstrom Analytical, Inc. conducted a limited building survey for the identification and assessment of accessible suspect ACM. This survey was conducted on all floors, excluding the mechanical areas (as they have been previously surveyed and are included for reference as Section 7.0, Appendix 2 of this report. To date, the following work has been completed:

A walk-through of the building's interior spaces, with observations of accessible suspect ACM and assessment of potential hazards from suspect ACM.

Suspect ACM bulk sample collection from representative areas and material types.

Analysis of bulk samples by polarized light microscopy using U.S. Environmental Protection Agency (EPA) Method 600/M4-82-020.

Preparation of this building survey report, including sample analysis results.

Compilation of an inventory of the identified ACM.

2.0 Project Results

2.1 Area of Investigation

The project consisted of 1 structure which is described in this report as follows:

- **1314 44th Avenue North, Hamilton Manor**, a six story concrete and brick constructed apartment high-rise building containing 220 dwelling units plus various common, office and mechanical areas. According to Gloria Bowman, the on-site manager, much of the first floor office and common areas have been remodeled in the last five years.

The name of this building / structure was designated or taken from verbal and written information Angstrom personnel received from Mr. Michael Barrowclough, Central Heating Chief Engineer for the Minneapolis Public Housing Authority. Building materials were identified and assessed in all representative areas requested by Mr. Barrowclough. Exempted areas include, but are not limited to, the mechanical room(s), see Appendix 2, and inaccessible areas that would need demolition of major building components, sheetrock or plaster on lath ceilings, walls and various pipe chases.

These materials were then grouped into homogenous systems and sampled, as explained in section 4.0 "Asbestos Building Survey Remarks." The survey did not include inaccessible interior components (e.g. pipe insulation in concealed chases).

2.2 Bulk Analysis Results

Please refer to the following section of this report for the analytical laboratory results of the samples collected, quantities, the response ratings & the material's locations and floor plan maps.

Abbreviation Code List

DAMAGE POTENTIAL - damage potential of the material

PSD - potential for significant damage
PD - potential for damage

COND - condition of material

N - little or no damage
D - moderate damage
SD - significant damage

UNITS - units of measurement

LF - linear foot
SF - square foot
EA - fitting

MATERIAL

| | |
|-----------------------------|-------------------------------|
| CP - ceiling panel | PI - pipe insulation |
| CT - ceiling tile | PFI - pipe fitting insulation |
| CTA - ceiling tile adhesive | FG - fiberglass |
| FT - floor tile | corr - corrugated paper |
| FTA - floor tile adhesive | |
| BB - baseboard | |
| BBA - baseboard adhesive | |

TYPE OF ASBESTOS

ANTH - Anthophyllite
CHR - Chrysotile
AM - Amosite
CROC - Crocidolite
ACT - Actinolite
TREM - Tremolite

* These samples were not analyzed. These results were inferred as consistent with the analyzed samples in the homogeneous set.

ND - No asbestos was detected in the sample submitted for analysis.
NS - Material not sampled.
NAC - Material not accessible.
< - less than the value specified.



Angstrom Analytical & Environmental Services

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Building Name: 1314 44th Ave North, Minneapolis, Minn
Survey Date: 6/23/00
Project No. Minneapolis Public Housing Authority
 Attn: Michael H. Barrowclough
 Central Heating Chief Engineer
 1611 South 5th Street
 Minneapolis, Minnesota

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| Location | Material Identification | Sample Number | Types of Asbestos | % | Quantity | Units | Cond. | Damage Potential | Response Rating |
|-----------------------------|-------------------------------|---------------|-------------------|-----|-------------|-------|-------|------------------|-----------------|
| Apartment 307 | 9"x9" tan & brown floor tiles | 1 to 3 | CHR | 2-3 | 325-350 | SF | N | PD | 1 |
| " | Black floor tile mastic | 4 to 6 | CHR | 2-3 | 325-350 | SF | N | PD | 1 |
| " | Ceiling texture | 7 to 9 | CHR | 3-5 | 325-350 | SF | N | PD | 3 |
| " | Sheetrock | 10 to 12 | ND | - | 1000-1500 | SF | N | PD | 0 |
| " | Black vinyl cove base | 13 to 15 | ND | - | 60-70 | LF | N | PD | 0 |
| " | Cove base adhesive | 16 to 18 | ND | - | 60-70 | LF | N | PD | 0 |
| Kitchen | Black sink undercoating | 19 to 21 | CHR | 5-8 | 1 | EA | N | PD | 2 |
| Windows | Caulking compound | 22 to 24 | ND | - | 14-20 | LF | N | PD | 0 |
| 6th Floor | | | | | | | | | |
| Corridor porches | Door & window caulk | 25 to 27 | ND | - | 40-50 | LF | N | PD | 0 |
| Corridor | 9"x9" tan & brown floor tiles | 28 to 30 | CHR | 3-5 | 3000-3500 | SF | N | PD | 1 |
| " | Black floor tile mastic | 31 to 33 | CHR | 2-3 | 3000-3500 | SF | N | PD | 1 |
| " | Ceiling texture | 34 to 36 | CHR | 3-5 | 3000-3500 | SF | N | PD | 3 |
| " | Sheetrock | 37 to 39 | ND | - | 13000-13500 | SF | N | PD | 0 |
| " | Brown vinyl cove base | 40 to 42 | ND | - | 1100-1200 | SF | N | PD | 0 |
| " | Cove base adhesive | 43 to 45 | ND | - | 1100-1200 | SF | N | PD | 0 |
| Stairwell walls | Skimcoat on cement | 46 to 48 | ND | - | 1600-1700 | SF | N | PD | 0 |

6th floor bathroom locked



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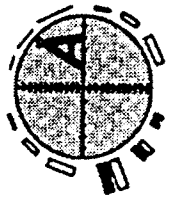
Building Name: 1314 44th Ave North, Minneapolis, Mn
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 * =

| Location | Material Identification | Sample Number | Types of Asbestos | % | Quantity | Units | Cond. | Damage Potential | Response Rating |
|-----------------------------|---------------------------------|---------------|-------------------|-------|-----------|-------|-------|------------------|-----------------|
| 6th Floor | | | | | | | | | |
| Janitor's closet | Ceiling texture | Ref 34 to 36 | CHR | 3-5 | 30-40 | SF | N | PD | 3 |
| " | Sheetrock | Ref 37 to 39 | ND | - | 200-225 | SF | N | PD | 0 |
| " | vinyl cove base | Ref 40 to 42 | ND | - | 20-25 | LF | N | PD | 0 |
| " | Cove base adhesive | Ref 43 to 45 | ND | - | 20-25 | LF | N | PD | 0 |
| Corridor | Window caulk | 49 to 51 | CHR | 10-12 | 40-45 | LF | N | PD | 1 |
| 5th Floor | | | | | | | | | |
| Bathroom | 9"x9" floor tiles | Ref 28 to 30 | CHR | 3-5 | 30-40 | SF | N | PD | 1 |
| " | Floor tile mastic | Ref 31 to 33 | CHR | 2-3 | 30-40 | SF | N | PD | 1 |
| " | Ceiling texture | Ref 34 to 36 | CHR | 3-5 | 55-65 | SF | N | PD | 3 |
| " | Sheetrock | Ref 37 to 39 | ND | - | 240-260 | SF | N | PD | 0 |
| " | Vinyl cove base | Ref 40 to 42 | ND | - | 15-20 | LF | N | PD | 0 |
| " | Cove base adhesive | Ref 43 to 45 | ND | - | 15-20 | LF | N | PD | 0 |
| Corridor | 9"x9" tan and brown floor tiles | Ref 28 to 30 | CHR | 3-5 | 1900-2000 | SF | N | PD | 1 |
| " | Floor tile mastic | Ref 31 to 33 | CHR | 2-3 | 1900-2000 | SF | N | PD | 1 |
| " | 12"x12" gray floor tiles | 52 to 54 | ND | - | 900-950 | SF | N | PD | 0 |
| " | Floor tile mastic | Ref 31 to 33 | CHR | 2-3 | 900-950 | SF | N | PD | 1 |



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| Location | Material Identification | Sample Number | Types of Asbestos | % | Quantity | Units | Cond. | Damage Potential | Response Rating |
|---------------------------------|---|---------------|-------------------|-----|-----------|-------|-------|------------------|-----------------|
| 5 th Floor Corridor | Brown window caulk | 55 to 57 | ND | - | 150-175 | SF | N | PD | 0 |
| " | Remaining materials like 6 th fl | - | - | - | - | - | - | - | - |
| Janitor's closet | Same as 6 th floor | - | - | - | - | - | - | - | - |
| Stairwell | Same as 6 th floor | - | - | - | - | - | - | - | - |
| 4 th Floor | | | | | | | | | |
| Corridor | Ceiling texture | 58 to 60 | CHR | 3-5 | 3000-3500 | SF | N | PD | 3 |
| " | 12"x12" gray floor tiles | Ref 52 to 54 | ND | - | 150-200 | SF | N | PD | 0 |
| " | Floor tile mastic | Ref 31 to 33 | CHR | 2-3 | 150-200 | SF | N | PD | 1 |
| " | Remaining materials like 6 th fl | - | - | - | - | - | - | - | - |
| Janitor's closet | Same as 6 th floor | - | - | - | - | - | - | - | - |
| Stairwell | Same as 6 th floor | - | - | - | - | - | - | - | - |
| Porches | Same as 6 th floor | - | - | - | - | - | - | - | - |
| 3 rd Fl Common Areas | Same as 6 th floor | - | - | - | - | - | - | - | - |
| 2 nd Floor | | | | | | | | | |
| Corridor | 12"x12" lt brown floor tiles | 64 to 66 | ND | - | 3000-3500 | SF | N | PD | 0 |
| " | Black floor tile mastic | 67 to 69 | CHR | 2-3 | 3000-3500 | SF | N | PD | 1 |
| " | Remaining materials like 6 th fl | - | - | - | - | - | - | - | - |

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| Location | Material Identification | Sample Number | Types of Asbestos | % | Quantity | Units | Cond. | Damage Potential | Response Rating |
|-----------------------------|-------------------------------|---------------|-------------------|-----|----------|-------|-------|------------------|-----------------|
| 2nd Floor | | | | | | | | | |
| Janitor's closet | Same as 6 th floor | - | - | - | - | - | - | - | - |
| Bathroom | Same as 6 th floor | - | - | - | - | - | - | - | - |
| Stairwell | Same as 6 th floor | - | - | - | - | - | - | - | - |
| 1st Floor | | | | | | | | | |
| Corridor | Brick-like floor not tested | - | - | - | - | - | - | - | - |
| Lounge | Skimcoat | 79 to 81 | ND | - | 450-500 | SF | N | PD | 0 |
| East Laundry Room | Sheetrock | 70 to 72 | ND | - | 800-1000 | SF | N | PD | 0 |
| Electrical room | Sheetrock | Ref 70 to 72 | ND | - | 100-500 | SF | N | PD | 0 |
| East Laundry Room | Ceiling texture | 73 to 75 | CHR | 3-5 | 250-300 | SF | N | PD | 3 |
| Library | White sink undercoating | 76 to 78 | ND | - | 1 | EA | N | PD | 0 |
| West Laundry Room | Ceiling texture | Ref 73 to 75 | CHR | 3-5 | 250-300 | SF | N | PD | 3 |
| " | Sheetrock | Ref 70 to 72 | ND | - | 800-1000 | SF | N | PD | 0 |
| Apartment 503 | Same as apartment 307 | - | - | - | - | - | - | - | - |
| Apartment 405 | Same as apartment 307 | - | - | - | - | - | - | - | - |
| Apartment 233 | Same as apartment 307 | - | - | - | - | - | - | - | - |

1314 44th Avenue North (Hamilton Manor) - Discussion

1314 44th Avenue North, Hamilton Manor, a six story concrete and brick constructed apartment high-rise building containing 220 dwelling units plus various common, office and mechanical areas. According to Gloria Bowman, the on-site manager, much of the first floor office and common areas have been remodeled in the last five years.

Representative bulk samples of suspect ACM were acquired from the building. Materials considered suspect and subsequently sampled included:

- Various floor tiles and associated mastic
 - Sheetrock, tape & compound
 - Sink undercoatings
 - Various skimcoats
 - Ceiling texture
 - Cove base and cove base adhesives
 - Various caulking compounds
- What about TSI?*

Of the materials sampled, the following were found to be asbestos-containing (pursuant to EPA definitions):

- **9"x9" floor tiles and associated mastic**
- **Ceiling texture**
- **Black sink undercoating**
- **Black tar-like window caulk**
- **Black mastic beneath non-ACM 12"x12" floor tiles**

Specifically:

9"x9" floor tiles and associated black mastic –

1. Approximately 325 to 350 square feet of 9"x9" floor tiles plus the associated black floor tile mastic in several of the dwelling units in generally good condition.
2. Approximately 3,000 to 3,500 square feet of 9"x9" floor tiles plus the associated black floor tile mastic the corridors, unless otherwise specified, in generally good condition, unless otherwise specified. *Approximately 200 square feet of 9"x9" floor tiles were recently removed on the fourth and fifth floor by S., K. & N. Not all of the black floor tile mastic was removed.*
3. Approximately 30 to 40 square feet of 9"x9" floor tiles plus the associated black floor tile mastic in the 5th floor bathroom in generally good condition.
4. Approximately 1,900 to 2,000 square feet of 9"x9" floor tiles plus the associated black floor tile mastic in the fifth floor in generally good condition.

Ceiling Texture

1. Approximately 325 to 350 square feet of ceiling texture in the dwelling units in generally good condition.
2. Approximately 3,000 to 3,500 square feet of ceiling texture in each corridor in generally good condition.
3. Approximately 30 to 40 square feet of ceiling texture in the janitor's closets on each floor in generally good condition.
4. Approximately 55 to 65 square feet of ceiling texture in the common bathrooms on each floor in generally good condition.
5. Approximately 250 to 300 square feet of ceiling texture in the east laundry room in generally good condition.
6. Approximately 250 to 300 square feet of ceiling texture in the west laundry room in generally good condition.

Black Sink Undercoating –

1. One kitchen sink with black undercoating in each dwelling unit in generally good condition.

Black tar-like Window Caulk –

1. Approximately 40 to 45 linear feet of black tar-like window caulk around the windows in the corridors in generally good condition.

Black Mastic Beneath non-ACM 12”x12” Floor Tiles –

1. Approximately 900 to 950 square feet of black floor tile mastic beneath non-ACM 12”x12” floor tiles in the fifth floor corridor in generally good condition.
2. Approximately 3,000 to 3,500 square feet of black floor tile mastic beneath non-ACM 12”x12” floor tiles in the second floor corridors.

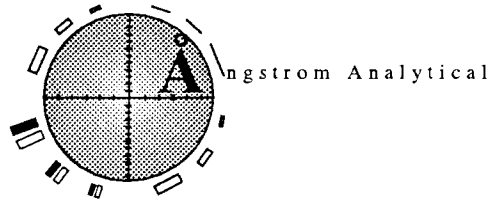
2.3 Response Action Ratings and Alternatives

There are four recognized alternative courses of action to control ACMs in buildings: (1) removal and disposal; (2) enclosure; (3) encapsulation; and (4) no action, with implementation of an operations and maintenance (O & M) / continued surveillance program. The selection of any particular alternative should be based on intended use of the building, exposure potential, construction or demolition activity, cost, and current regulations.

Each Assessment Table includes a response action based on factors such as friability, accessibility, potential for disturbance, etc. Definitions for the response ratings are listed below:

- 0 = Material does not contain detectable amounts of asbestos and requires no asbestos related abatement action.
- 1 = Material contains asbestos, was nonfriable, and requires no abatement action unless sanded, abraded, drilled, or otherwise disturbed. We recommend periodic reassessment of condition.
- 2 = Material contains asbestos and was friable. Damage was not observed; no immediate abatement action is required. We recommend periodic inspections for confirmation of the condition of the material.
- 3 = Material contains asbestos, was friable, and shows signs of localized damage with a potential for disturbance. Repair or removal is recommended to reduce the potential for fiber release. Periodic inspections are highly recommended.
- 4 = Material contains asbestos, was significantly damaged, and immediate removal is recommended.

2.4 Photography





Plates 1 & 2: Showing asbestos containing ceiling texture material on the 3rd and 4th floor corridors respectively. (Typical).





Plate 3: Showing exterior windows with black colored ACM Caulk.

Plate 4: Showing vinyl asbestos floor tile (9" x 9") and associated mastic under the carpet on the 3rd floor corridor.



Plates 5 & 6: Showing the extent of the S.K. and N. removal effort of the 9" x 9" and 12" x 12" floor tiles. Black colored asphaltic ACM mastic remains under the new floor covering.



3.0 RECOMMENDATIONS

3.1 Long-Term Response Actions

Please note that any asbestos-containing building materials that may become friable during demolition must be removed prior to that time, pursuant to EPA National Emissions Standards for Hazardous Air Pollutants regulations.

3.2 Deferred Action Consideration

The EPA has indicated that there are no longer grounds for completely deferring action once asbestos is identified in a building. Under ideal conditions (minimum access by occupants, no mechanical vibrations, no physical or water damage, no excessive airstream exposure, etc.), the minimum corrective action should be implementation of an O&M program and periodic surveillance of the material. An O&M program would require the identification of all accessible asbestos in the building and establishment of guidelines for proper safety precautions, cleaning methods, etc., that should be undertaken when emergency or routine maintenance work may disturb asbestos.

Please note that recommendations in this report to defer action regarding certain materials are accompanied by a recommendation to implement an O&M program. A recommendation to defer action means that, in our opinion, the condition of the particular material at the time of observation was such that release of airborne fibers appeared relatively low, and that other response actions did not appear to be warranted at the time. Any changes in the condition of the material may warrant corrective actions at a later date. The effective management of these particular situations is, therefore, crucial.

4.0 Asbestos Building Survey Remarks

Prior to the collection of bulk material samples, suspect ACM was categorized into homogeneous material types and areas. A homogeneous material type is defined as friable or nonfriable suspect ACM that has the same visual appearance (color, texture, pattern), that was either applied or constructed during the same general time period. Material composition appeared to be consistent within a defined type and area. Friable materials are those that can be crushed, pulverized, or reduced to powder by hand-pressure when dry.

The samples were collected at random locations from the predetermined homogeneous sampling areas to provide analytical data to document and evaluate current site conditions. Data were obtained from discrete sample locations, and no guarantee is given that the inferred conditions currently exist. Materials were wetted prior to sampling to minimize potential fiber release; the samples were then sealed in polyethylene bags.

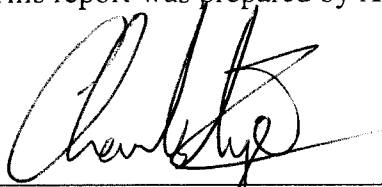
Bulk samples were analyzed according to EPA Method 600/M4-82-020, utilizing polarized light microscopy and dispersion staining techniques. The lower detection limit for verification of bulk asbestos fibers is 1 percent asbestos by volume. The method cited above provides the percentage of asbestos present and distinguishes the following types of asbestos: chrysotile, amosite, crocidolite, tremolite, actinolite, and anthophyllite. The portions of the samples that were not consumed in the analysis will be retained by Angstrom for a period of 30 days from the date of this report. The samples will be disposed of if Angstrom does not receive written notification prior to the 30th day.

The sets of samples from each homogeneous area were analyzed until positive. That is, under the EPA guidelines, once a sample in a set from a homogeneous material is found to contain greater than one percent asbestos by volume, the homogeneous material area is assumed to contain asbestos and additional sample analysis is terminated. This information is used only to determine whether a material is ACM and the appropriate response actions that should be taken.

Any discussion or recommendations contained in this report represent our professional opinions. These opinions are based on currently available information and are arrived at in accordance with currently accepted industrial hygiene practices at this time and location. Other than this, no guarantee is implied or intended.

The recommendations contained in this report represent our professional opinions. These opinions are based on currently available information and are arrived at in accordance with currently accepted hydrogeologic and engineering practices at this time and location. Other than this, no warranty is implied or intended.

This report was prepared by **Angstrom Analytical, Inc.**



Charles Tye
Asbestos Inspector #I395
Certified by State of Minnesota

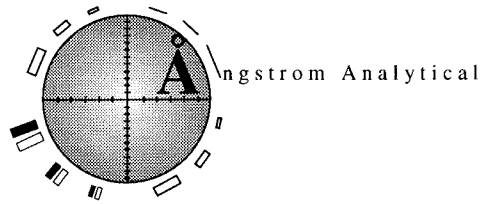
Date 7/20/00



Les Plath
Asbestos Inspector #I3390
Certified by State of Minnesota

Date 7/20/00

5.0 Licenses & Certifications





**Angstrom Analytical, Inc.
12203 Princeton Avenue
Eden Prairie, MN, 55347**

is hereby authorized in accordance with Minnesota Rules, parts 4761.1000 - 4761.1230,
to practice in the State of Minnesota as a:

**Lead Certified Firm
License No. 127
Expires 5/1/02**

This certificate is nontransferable.

Patricia A. Bloogren, Director
Division of Environmental Health

Jan K. Malcom
Commissioner

Minnesota Department of Health

Asbestos-Contractor License

License Number: 413

Issued on: November 1, 2000

To

**Angstrom Analytical, Inc.
12203 Princeton Avenue
Eden Prairie, MN 55347**

Responsible Individual: Charles Tye

This license expires on October 31, 2001.

*Pursuant to Minnesota Statutes, section 144.99, this license
may be suspended or revoked for failure to conduct asbestos-
related work in compliance with applicable regulations.*

*Asbestos-related work must be conducted according to Minnesota
Statutes, sections 326.70 to 326.81 and Minnesota Rules,
parts 4620.3000 to 4620.3724.*

Patricia A. Bloomgren, Director
Division of Environmental Health



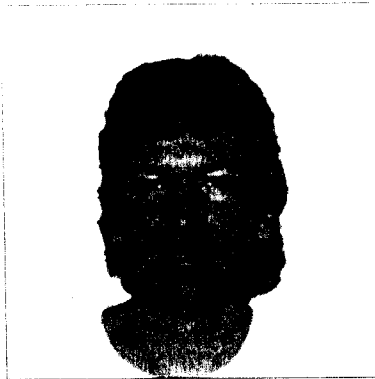
**ASBESTOS
INSPECTOR**

**Certified by:
State of Minnesota
Department of Health
Expires: 01/19/2002**

**Charles Tye
12203 Princeton Ave
Eden Prairie, MN 55347**

John Mallico
Commissioner of Health

No. AI395 Issued: 01/26/2001



**ASBESTOS
INSPECTOR**

**Certified by:
State of Minnesota
Department of Health
Expires: 08/07/2002**

**John M Partlow
29923 Karmel Ave
Chisago City, MN 55013**

John Mallico
Commissioner of Health

No. AI2226 Issued: 08/13/2001



**ASBESTOS
INSPECTOR**

**Certified by:
State of Minnesota
Department of Health
Expires: 06/26/2002**

**Robert J Landowski
2936 Lee Ave N
Golden Valley, MN 55422**

John Mallico
Commissioner of Health

No. AI2646 Issued: 07/05/2001



ASBESTOS
INSPECTOR

Certified by:

State of Minnesota
Department of Health

Expires: **03/15/2002**

Darrell T Potocnik
6538 Deerwood Lane
Lino Lakes, MN 55014

Commissioner of Health

No. A12219

Issued: 03/29/2001



ASBESTOS
INSPECTOR

Certified by:

State of Minnesota
Department of Health

Expires: **11/10/2001**

Les R Plath
8330 Oak Ln
Becker, MN 55308

Commissioner of Health

No. A13390

Issued: 12/06/2000

6.0 Appendix 1

Analyst's Work Sheets



Abbreviation Code List

DAMAGE POTENTIAL - damage potential of the material

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EA - fitting

MATERIAL

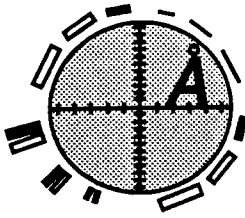
| | |
|-----------------------------|-------------------------------|
| CP - ceiling panel | PI - pipe insulation |
| CT - ceiling tile | PFI - pipe fitting insulation |
| CTA - ceiling tile adhesive | FG - fiberglass |
| FT - floor tile | corr - corrugated paper |
| FTA - floor tile adhesive | |
| BB - baseboard | |
| BBA - baseboard adhesive | |

TYPE OF ASBESTOS

ANTH - Anthophyllite
CHR - Chrysotile
AM - Amosite
CROC - Crocidolite
ACT - Actinolite
TREM - Tremolite

* These samples were not analyzed. These results were inferred as consistent with the analyzed samples in the homogeneous set.

ND - No asbestos was detected in the sample submitted for analysis.
NS - Material not sampled.
NAC - Material not accessible.
< - less than the value specified.



Angstrom Analytical, Inc.

**12203 Princeton Avenue
Eden Prairie, MN 55347
Office: (952) 941-4805
FAX: (952) 829-7273**

**ANALYSIS OF BULK SAMPLES FOR ASBESTOS USING POLARIZED LIGHT
MICROSCOPY (PLM)**

| | |
|---------------------------------|--|
| Prepared for: | Michael H. Barrowclough, Chief Engineer Minneapolis Public Housing Authority 1611 South 6th Street Minneapolis, MN 55454 |
| Client Job or reference: | 1314 44th Avenue North (Hamilton Manor) |
| Number of samples: | 78 collected / 56 analyzed |

METHOD AND DEFINITIONS

The submitted samples were analyzed using the EPA Interim Method #600/M4-82-020 (polarized light microscopy with optional dispersion staining). The method defines an asbestos-containing material as one that contains greater than 1% asbestos by weight, and asbestos is defined as the fibrous forms of serpentine and certain amphiboles. While the fibrous and non-fibrous forms of minerals are discernible macroscopically in hand specimens, the distinction between them is not clear on a microscopic level, especially after processing or manufacturing. Fibrous amphiboles are generally those whose mean aspect ratios (length over width) under the microscope are approximately >10; non-fibrous amphiboles are generally those whose mean aspect ratios are approximately <6. During analysis, morphology and an estimate of mean aspect ratio are used to assign a given mineral fiber population to fibrous or non-fibrous categories. That non-fibrous amphiboles are not reported as asbestos is consistent with mineralogical definitions, but does not imply that non-fibrous amphiboles are not hazardous. Airborne concentrations of them may be regulated by OSHA under certain circumstances. The type of dispersion staining used is generally phase contrast, although central stop dispersion staining may also be used.

PERCENTAGE REPORTING

The percentage of each fiber type present was determined using volume percents estimated from stereoscopic examination, projected area percents from mounted slide examination and percents from comparison to weight percent standards. Such estimations are suitable for most samples, but do have large error ranges. Errors are estimated to be 100 relative percent uncertainty for percentage estimates under 10% ranging down to as little as 10 relative percent uncertainty for percentage estimates greater than 50%. Friable samples which have been estimated by the above methods to contain less than 10% asbestos can be point-counted, according to the EPA Interim Method, as required by NESHAPS. In low percentage samples, point counting may produce false negatives or positives, due to the small number of points counted.

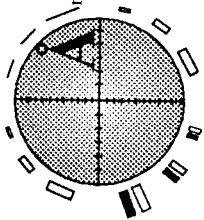
For samples consisting of more than one apparent type of material or layer, the percentage of each fiber type in each type of material or layer is determined and reported separately; an overall average for the sample of each fiber type is then calculated. The reported friability of a sample refers to that friability observed in the condition analyzed (broken, crushed, etc), and is not to be substituted for an on-site assessment of friability.

Each Angstrom Analytical Lab report relates only to the sample tested and may not, due to the sampling process, be representative of the material sampled.



Tom Key

Date: July 20th, 2000

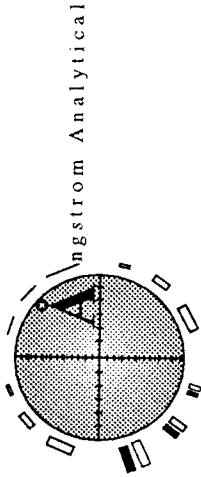


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**ASBESTOS (PLM) BULK SAMPLES:
REPORT OF MATERIALS ANALYSIS**

| | | | | |
|---|--|------------------------------|------------------------------|---------------------------|
| CLIENT MPHA | Project Location 1314 49th Ave N, Mpls, MN | Results Via Report | Data Entry 7-6-00 | Approved By TK |
| CLIENT ADDRESS AH: Michael Barrowclough | Client/Receiving # 01 to 09 | Assigned/Lab # | Project # 0nd.ite | Analyst TK |
| | | | Date Rec'd 6-23-00 | Analyzed 7-6-00 |
| | | | Date Mailed | Phoned |

| Sample Number | Material | Physical Description | Location | Asbestos Type | Approximate Percent |
|---------------|--------------------|----------------------|----------------|---------------|---------------------|
| 01 | 9" x 9" Floor Tile | Tan w/ Brown | Apartment #307 | CHR | 2-3 |
| 02 | ↓ | ↓ | ↓ | not analyzed | |
| 03 | ↓ | ↓ | | not analyzed | |
| 04 | Floor Tile | Black | | CHR | 2-3 |
| 05 | ↓ | ↓ | | not analyzed | |
| 06 | ↓ | ↓ | | not analyzed | |
| 07 | Textured Ceiling | wh.ite | | CHR | 3-5 |
| 08 | ↓ | ↓ | | not analyzed | |
| 09 | ↓ | ↓ | | not analyzed | |

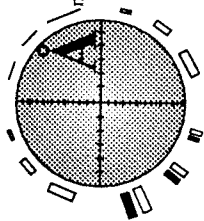


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**ASBESTOS (PLM) BULK SAMPLES:
REPORT OF MATERIALS ANALYSIS**

| | | | | |
|--|----------------------------------|-----------------------|-----------------------|--------------------|
| CLIENT MPHA | Project Location 1314 4th Ave | Results Via Report | Data Entry 7-6-00 | Approved By TK |
| CLIENT ADDRESS Attn: Michael Barrowclough | Client/Receiving # 10 to 18 | Assigned/Lab # | Project # 025k | Analyst |
| Fax # | | | Date Rec'd 6-23-00 | Analyzed 7-6-00 |
| | | | Date Mailed | Phoned |

| Sample Number | Material | Physical Description | Location | Asbestos Type | Approximate Percent |
|---------------|--------------------|----------------------|----------|---------------|---------------------|
| 10 | Sheetrock | white | Apt. 307 | None detected | |
| 11 | ↓ | ↓ | | None detected | |
| 12 | ↓ | ↓ | | None detected | |
| 13 | Black Cove Base | Black | | None detected | |
| 14 | ↓ | ↓ | | None detected | |
| 15 | ↓ | ↓ | | None detected | |
| 16 | Cove Base Adhesive | Brown | | None detected | |
| 17 | ↓ | ↓ | | None detected | |
| 18 | ↓ | ↓ | | None detected | |



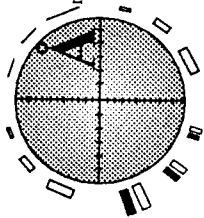
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ASBESTOS (PLM) BULK SAMPLES: REPORT OF MATERIALS ANALYSIS

| | | | | |
|---|---|------------------------------|------------------------------|---------------------------|
| CLIENT MPHA | Project Location 1314 44th Ave. No. Mpls. Mn Report | Results Via Report | Data Entry 7-6-00 | Approved By TK |
| CLIENT ADDRESS AH: Michael Barrowclough | Client/Receiving # 19 to 27 | Assigned/Lab # | Project # On Site | Analyst TK |
| | Fax # | | Date Rec'd 6-23-00 | Analyzed 7-6-00 |
| | | | Date Mailed | Phoned |

| Sample Number | Material | Physical Description | Location | Asbestos Type | Approximate Percent |
|---------------|-------------------|----------------------|---------------------------------|---------------|---------------------|
| 19 | Sink Undercoating | Black | Apt. 307 Kitchen | CHR | 5-8 |
| 20 | ↓ | ↓ | ↓ | not analyzed | |
| 21 | ↓ | ↓ | ↓ | not analyzed | |
| 22 | Window Caulk | Gray | Apt. 307 Exterior Windows | AMM detected | |
| 23 | ↓ | ↓ | ↓ | AMM detected | |
| 24 | ↓ | ↓ | ↓ | AMM detected | |
| 25 | Window Poor Caulk | Gray | 6th Floor Outside Porches/Doors | AMM detected | |
| 26 | ↓ | ↓ | ↓ | AMM detected | |
| 27 | ↓ | ↓ | ↓ | AMM detected | |

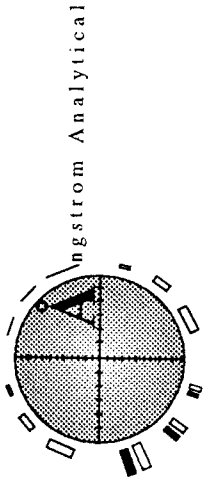


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**ASBESTOS (PLM) BULK SAMPLES:
REPORT OF MATERIALS ANALYSIS**

| | | | | |
|--|--|----------------------------------|------------------------------|---------------------------|
| CLIENT MPHA | Project Location 1314 44th Ave N | Results Via MPA Report | Data Entry 7-6-00 | Approved By TK |
| CLIENT ADDRESS Attn: Michael Barrowbough | Client/Receiving # 28 to 36 | Assigned/Lab # | Project # 6-2300 | Analyst TK |
| | | | Date Rec'd 6-23-00 | Analyzed 7-6-00 |
| | | | Date Mailed | Phoned |

| Sample Number | Material | Physical Description | Location | Asbestos Type | Approximate Percent |
|---------------|--------------------|----------------------|-------------------|---------------|---------------------|
| 28 | 8" x 9" Floor Tile | Tan w/ Brown | 6th Floor Hallway | CHR | 35 |
| 29 | ↓ | ↓ | ↓ | not analyzed | |
| 30 | ↓ | ↓ | ↓ | not analyzed | |
| 31 | Floor Tile Mastic | Black | | CHR | 23 |
| 32 | ↓ | ↓ | | not analyzed | |
| 33 | ↓ | ↓ | | not analyzed | |
| 34 | Textured Ceiling | White | | CHR | 3-5 |
| 35 | ↓ | ↓ | | not analyzed | |
| 36 | ↓ | ↓ | | not analyzed | |

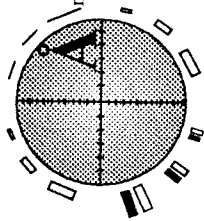


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**ASBESTOS (PLM) BULK SAMPLES:
REPORT OF MATERIALS ANALYSIS**

| | | | | |
|---|----------------------------|-----------------------------|--------------------|----------------|
| CLIENT MPHA | Project Location 1314 44th | Results Via Report | Data Entry 7-600 | Approved By |
| CLIENT ADDRESS Attn: Michael Barronclough | Ave. No. Mpls. Mn. | Client/Receiving # 37 to 45 | Project # ON-SITE | Analyst TR |
| Fax # | Assigned/Lab # | | Date Rec'd 6-23-00 | Analyzed 7-600 |
| | | | Date Mailed | Phoned |

| Sample Number | Material | Physical Description | Location | Asbestos Type | Approximate Percent |
|---------------|--------------------|----------------------|----------------------|---------------|---------------------|
| 37 | Sheetrock | White | 6th Floor Hallway | None detected | |
| 38 | ↓ | ↓ | | None detected | |
| 39 | ↓ | ↓ | | None detected | |
| 40 | Brown Cove Base | Brown | | None detected | |
| 41 | ↓ | ↓ | | None detected | |
| 42 | ↓ | ↓ | | None detected | |
| 43 | Cove Base Adhesive | Brown | | None detected | |
| 44 | ↓ | ↓ | | None detected | |
| 45 | ↓ | ↓ | | None detected | |

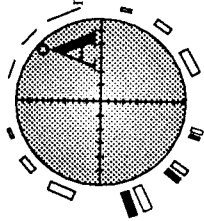


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ASBESTOS (PLM) BULK SAMPLES: REPORT OF MATERIALS ANALYSIS

| | | | | |
|---|---|---------------------------|---------------------------|--------------------------|
| CLIENT MPHA | Project Location 1314 44th Ave N, Mpls, MN | Results Via Report | Data Entry 7-6-00 | Approved By _____ |
| CLIENT ADDRESS Attn: Michael Barrowclough | Client/Receiving # 46 to 54 | Assigned/Lab # _____ | Project # Chd Site | Analyst TK |
| Fax # _____ | | | Date Rec'd 6-23-00 | C Analyzed 7-6-00 |
| | | | Date Mailed _____ | Phoned _____ |

| Sample Number | Material | Physical Description | Location | Asbestos Type | Approximate Percent |
|---------------|---------------------------|----------------------|------------------------|---------------|---------------------|
| 46 | Skim coat on Cement walls | White | 6th Floor Stairwell | None detected | |
| 47 | ↓ | ↓ | ↓ | None detected | |
| 48 | ↓ | ↓ | ↓ | None detected | |
| 49 | Tar over windows on walls | Black | 6th Floor East Hallway | CHR | 10-12 |
| 50 | ↓ | | ↓ | Not analyzed | |
| 51 | ↓ | | ↓ | Not analyzed | |
| 52 | 12" x 12" Floor Tile | Gray w/white | 5th Floor Hallway | None detected | |
| 53 | ↓ | ↓ | ↓ | None detected | |
| 54 | ↓ | ↓ | ↓ | None detected | |



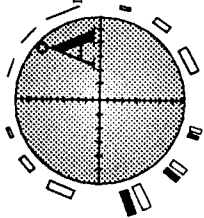
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Eden Prairie, MN 55347

ASBESTOS (PLM) BULK SAMPLES: REPORT OF MATERIALS ANALYSIS

| | | | | |
|--|---|----------------|---------------------------|------------------------|
| CLIENT MPHA | Project Location 1314 44th Ave N, Mpls, MN | Results Via | Data Entry 7-8-00 | Approved By _____ |
| CLIENT ADDRESS Ahn: Michael Barrowclough | Client/Receiving # 55 to 63 | Assigned/Lab # | Project # On disk | Analyst TK/PT |
| Fax # _____ | | | Date Rec'd 6-26-00 | Analyzed 7-8-00 |
| | | | Date Mailed _____ | Phoned _____ |

| Sample Number | Material | Physical Description | Location | Asbestos Type | Approximate Percent |
|---------------|------------------|----------------------|----------------------------|---------------|---------------------|
| 55 | Window Caulk | Brown | 5th Floor Hallway | none detected | |
| 56 | ↓ | ↓ | ↓ | none detected | |
| 57 | ↓ | ↓ | ↓ | none detected | |
| 58 | Textured Ceiling | white | 4th Floor Hallway | CHC | 3-5 |
| 59 | ↓ | ↓ | ↓ | not analyzed | |
| 60 | ↓ | ↓ | ↓ | not analyzed | |
| 61 | Sheetrock | white | 3rd Floor Jan. bris Closet | none detected | |
| 62 | ↓ | ↓ | ↓ | none detected | |
| 63 | ↓ | ↓ | ↓ | none detected | |



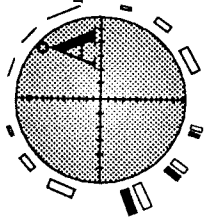
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Eden Prairie, MN 55347

ASBESTOS (PLM) BULK SAMPLES: REPORT OF MATERIALS ANALYSIS

| | | | | |
|---|---|------------------------------|------------------------------|---------------------------|
| CLIENT MPHA | Project Location 1317 44th Ave No, Mpls, MN | Results Via Report | Data Entry 7-8-00 | Approved By _____ |
| CLIENT ADDRESS Attn: Michael Barrows bugh | Client/Receiving # 64 to 72 | Assigned/Lab # _____ | Project # 012116 | Analyst TR/CT |
| Fax # _____ | | | Date Rec'd 6-26-00 | Analyzed 7-8-00 |
| | | | Date Mailed _____ | Phoned _____ |

| Sample Number | Material | Physical Description | Location | Asbestos Type | Approximate Percent |
|---------------|----------------------|----------------------|-----------------------------------|---------------|---------------------|
| 64 | 12" x 12" Floor Tile | Light Brown | 2nd Floor Hallway | none detected | |
| 65 | ↓ | | | none detected | |
| 66 | ↓ | | | none detected | |
| 67 | Mastic | Black | | CHR 23 | |
| 68 | ↓ | | | not analyzed | |
| 69 | ↓ | | | not analyzed | |
| 70 | Spectrack | White | 1st Floor East Laundry Room | none detected | |
| 71 | ↓ | | | none detected | |
| 72 | ↓ | | | none detected | |



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**ASBESTOS (PLM) BULK SAMPLES:
REPORT OF MATERIALS ANALYSIS**

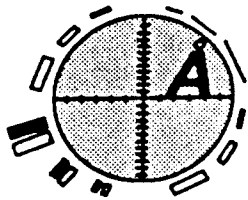
| | | | | |
|--|--|------------------------------|---------------------------|-----------------------------|
| CLIENT MPHA | Project Location 1314 44th Ave N, MPLS. | Results Via Report | Data Entry 7-8-00 | Approved By TK/CT |
| CLIENT ADDRESS Attn: Michael Berrowlough | Client/Receiving # 73 to 78 | Assigned/Lab # | Project # On Site | Analyst |
| | | | Date Rec'd 6-26-00 | Analyzed 7-8-00 |
| | | | Date Mailed | Phoned |

| Sample Number | Material | Physical Description | Location | Asbestos Type | Approximate Percent |
|---------------|------------------|----------------------|-----------------------------|---------------|---------------------|
| 73 | Textured Ceiling | White | 1st Floor Laundry Room East | CHR | 3-5 |
| 74 | ↓ | ↓ | ↓ | not analyzed | |
| 75 | ↓ | ↓ | ↓ | not analyzed | |
| 76 | Sack Undercoat | White | 1st Floor Library | None detected | |
| 77 | ↓ | ↓ | ↓ | None detected | |
| 78 | ↓ | ↓ | ↓ | None detected | |
| | | | | | |
| | | | | | |
| | | | | | |

7.0 Appendix 2

Asbestos Survey of Boiler Room & Mechanical Spaces





**ANALYSIS OF BULK SAMPLES FOR ASBESTOS USING POLARIZED LIGHT
MICROSCOPY (PLM)**

Prepared for: Michael H. Barrowclough, Chief Engineer
Minneapolis Public Housing Authority
1611 South 6th Street
Minneapolis, MN 55454

Client Job or reference: 1314 44th Ave No /Boiler & Mechanical Rooms.

Number of samples: 36 collected / 22 analyzed.

METHOD AND DEFINITIONS

The submitted samples were analyzed using the EPA Interim Method #600/M4-82-020 (polarized light microscopy with optional dispersion staining). The method defines an asbestos-containing material as one that contains greater than 1% asbestos by weight, and asbestos is defined as the fibrous forms of serpentine and certain amphiboles. While the fibrous and non-fibrous forms of minerals are discernible macroscopically in hand specimens, the distinction between them is not clear on a microscopic level, especially after processing or manufacturing. Fibrous amphiboles are generally those whose mean aspect ratios (length over width) under the microscope are approximately >10; non-fibrous amphiboles are generally those whose mean aspect ratios are approximately <6. During analysis, morphology and an estimate of mean aspect ratio are used to assign a given mineral fiber population to fibrous or non-fibrous categories. That non-fibrous amphiboles are not reported as asbestos is consistent with mineralogical definitions, but does not imply that non-fibrous amphiboles are not hazardous. Airborne concentrations of them may be regulated by OSHA under certain circumstances. The type of dispersion staining used is generally phase contrast, although central stop dispersion staining may also be used.

PERCENTAGE REPORTING

The percentage of each fiber type present was determined using volume percents estimated from stereoscopic examination, projected area percents from mounted slide examination and percents from comparison to weight percent standards. Such estimations are suitable for most samples, but do have large error ranges. Errors are estimated to be 100 relative percent uncertainty for percentage estimates under 10% ranging down to as little as 10 relative percent uncertainty for percentage estimates greater than 50%. Friable samples which have been estimated by the above methods to contain less than 10% asbestos can be point-counted, according to the EPA Interim Method, as required by NESHAPS. In low percentage samples, point counting may produce false negatives or positives, due to the small number of points counted.

For samples consisting of more than one apparent type of material or layer, the percentage of each fiber type in each type of material or layer is determined and reported separately; an overall average for the sample of each fiber type is then calculated. The reported friability of a sample refers to that friability observed in the condition analyzed (broken, crushed, etc), and is not to be substituted for an on-site assessment of friability.

Each Angstrom Analytical Lab report relates only to the sample tested and may not, due to the sampling process, be representative of the material sampled.


Tom Key

-----Date: May 28th, 1998

Prepared by: **Angstrom Analytical, Inc.**
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 Office: (612) 941-4805 • FAX: (612) 829-7273



**Angstrom Analytical &
 Environmental Services**

Building Name: 1314 44th Avenue North
Survey Date: 5/26/98
Project No. Attn: Michael H. Barrowclough
 Chief Engineer / Central Heating
 Minneapolis Public Housing Authority
 1611 South 6th Street
 Minneapolis, MN 55454

PSD = potential for significant damage
 PD = potential for damage
 N = little or no damage
 D = moderate damage
 SD = significant damage
 LF = linear foot
 SF = square foot

EA = fitting
 TREM = Tremolite
 CHR = Chrysotile
 AM = Amosite
 CROC = Crocidolite
 ACT = Actinolite
 ANTH = Anthophyllite

ND = no asbestos was detected in the sample submitted for analysis material not sampled
 NS = material not accessible
 NAC = less than value specified
 * = These samples were not analyzed. These results are inferred a consistent with the analyzed samples in the homogeneous set.

| Location | Material Identification | Sample Number | Types of Asbestos | % | Quantity | Units | Cond. | Damage Potential | Response Rating |
|----------------------|---------------------------------|---------------|-------------------|---------|----------|-------|-------|------------------|-----------------|
| Boiler Room | Boiler Stack TSI | 1 to 3 | CHR | 20-25 | 500 | SF | N | PD | 3 |
| " | Boiler Gasket | 4 to 6 | CHR | 90-95 | 3 | EA | N | PD | 3 |
| " | Steam Header Fitting TSI | 7 to 9 | ND | - | 15-20 | EA | N | PD | 0 |
| " | Steam Line Fitting TSI | 10 to 12 | CHR/AM | 2-3/5-8 | 20-30 | EA | N | PD | 3 |
| " | Cold Water Line Fitting TSI | 13 to 15 | CHR/AM | 2-3/5-8 | 30-40 | EA | N | PD | 3 |
| " | Hot Water Line Fitting TSI | 16 to 18 | CHR/AM | 2-3/5-8 | 30-40 | EA | N | PD | 3 |
| " | 8" Hot Water Line Fitting TSI | 19 to 21 | CHR/AM | 2-3/5-8 | 20-30 | EA | N | PD | 3 |
| Basement Mech. Rooms | Vibration Dampener | 22 to 24 | CHR | 90-95 | 3 | EA | N | PD | 3 |
| " | City Water Line Fitting TSI | 25 to 27 | ND | - | 20-30 | EA | N | PD | 0 |
| " | Hot Water Line Fitting TSI | 28 to 30 | ND | - | 20-30 | EA | N | PD | 0 |
| " | 8" Steam Line Fitting TSI | 31 to 33 | ND | - | 10-20 | EA | N | PD | 0 |
| " | debris on floor near water tank | 34 to 36 | ND | - | 4 | SF | SD | PSD | 0 |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |