Appendix D
Location Specific Technical Reports

February 5, 2017

University of Toronto
255 McCaul Street, 4th Floor
Toronto, Ontario
M5T 1W7

Attention: Mr. Irfan Miraj, P.Eng., MHSc.
Manager, Hazardous Construction Materials Group

Re: Post-Abatement Inspection and Air Testing Report
University of Toronto – Medical Sciences Building
SEL Project Number: 109017
Type 2 Operations – Rooms 6360, 7366 and 7368
1 King's College Circle, Toronto, Ontario

1.0 BACKGROUND

On February 4 and 5, 2017, Safetech Environmental Limited (SEL) conducted visual inspections and air sampling for airborne fibres after the cleanup of asbestos-containing dust within Rooms 6360, 7366 and 7368 at the University of Toronto's Medical Sciences Building located at 1 King's College Circle, Toronto, Ontario. Asbestos-containing dust had reportedly migrated into the aforementioned rooms from a Type 3 asbestos work area in Rooms 6366 and 6368 on Tuesday January 31, 2017.

The objective of the inspection and air testing was to ensure that the cleanup had been successfully completed and that the aforementioned rooms were safe for general occupancy. Please note that SEL was not involved with the Type 3 asbestos abatement project nor were we present during cleanup activities. Results of our visual inspections and air testing are presented in this report.

2.0 METHODOLOGY

2.1 Post-Abatement Visual Inspection

A visual inspection was conducted prior to performing post-abatement air testing. The objective of this visual inspection was to verify that all visible and accessible dust on horizontal and vertical surfaces, equipment and stored materials within the laboratories was adequately cleaned of visible dust.

2.2 Post-Abatement Air Testing

Once our visual inspection indicated acceptable conditions, post-abatement air testing was conducted. The air samplings were collected using 25-mm three-piece filter cassettes containing a 0.8 µm cellulose ester membrane filter and equipped with a 50-mm electrically conductive extension cowl. The filter cassettes were attached to high volume air sampling pumps calibrated with a filter cassette in line to a known flow rate.

At the completion of air testing, the samples were analyzed in accordance with U.S. National Institute of Occupational Safety and Health (NIOSH) Manual of Analytical Methods, Method 7400, Issue 2: Asbestos and other Fibres by PCM (August 15, 1994), using the asbestos fibre counting rules. As required by NIOSH Method 7400, field blanks were also analyzed to ensure that no contamination of the filters occurred during sampling or analytical procedures.

The quantitative working range of this method is 0.04 to 0.5 fibre/cc for a 1000 L air sample. The Limit of Detection (LOD) depends on sample volume and quantity of interfering dust, and is <0.01 fibre/cc for atmospheres free of interferences. Fibres less than approximately 0.25 µm in diameter will not be detected by this method. This analytical method gives an index of airborne fibres as it cannot differentiate between asbestos and other fibres. Other airborne particles that fall within the counting range criteria will act as positive interferences. Results of analysis have been field blank corrected and are reported as the concentration of fibres per cubic centimeter of air (f/cc).

3.0 RESULTS

3.1 Post-Abatement Visual Inspection

Our post-abatement visual inspection confirmed that all accessible asbestos-containing dust had been removed within Rooms 6360, 7366 and 7368 and the laboratories were deemed to be acceptably clean to allow for post-abatement air testing to be conducted. Photographs of our visual inspection further indicate the results of the abatement project in Appendix A.

3.2 Post-Abatement Air Testing

Results of post-abatement air testing are summarized below in Table 1.

TABLE 1
Results of Post-Abatement Air Testing
Rooms 6360, 7366 and 7368, 1 King's College Circle, Toronto, Ontario
Sample Collection Date: February 5, 2017

Sample No.	Sample Location	Time Start	Time Stop	Sample Volume (L)	Airborne Fibre Concentration (f/cc)
2017-02-014	Room 6360	10:05 AM	11:25 AM	1200	0.002
2017-02-015	Room 7366	10:10 AM	11:25 AM	1125	<0.002
2017-02-016	Room 7368	10:12 AM	10:27 AM	1125	0.003

4.0 CONCLUSIONS AND RECOMMENDATIONS

Results of our visual inspection confirmed that visible and accessible asbestos-containing dust had been cleanup within Rooms 6360, 7366 and 7368. Results of post-abatement air testing indicated that at the time of sampling, the airborne fibre concentrations within the aforementioned rooms were below the occupational exposure limit for asbestos (0.1 fibres/cc) and the generally accepted post-abatement standard (0.01 fibres/cc).

Based on our visual inspection and air testing results, the cleanup of asbestos-containing dust within Rooms 6360, 7366 and 7368 the University of Toronto's Medical Sciences Building located at 1 King's College Circle, Toronto, Ontario is deemed to be successfully completed.

5.0 LIMITATIONS

The investigation, assessments and recommendations detailed in this report were carried out in a manner consistent with the level of care and skill normally exercised by reasonable members of the environmental and industrial hygiene consulting profession currently practicing under similar conditions in the area. Furthermore, the investigation, assessments and recommendations in this report have been made based on conditions observed at the time of the assessment and are limited to the areas investigated.

Please note that SEL personnel did not have access to the internal components of equipment present in the laboratory and, therefore, cannot comment on these inaccessible surfaces within the rooms assessed. Our investigation was limited to visible and accessible surfaces within the laboratories affected.

In preparing this report, Safetech Environmental Limited (SEL) relied on information supplied by others. Conclusions made in this report are based on the laboratory analytical results for the air samples analyzed. Except as expressly set-out in this report, SEL has not made any independent verification of such information.

The analytical method used meets the requirements of O.Reg. 278/05. However, it is important to note that this method is not specific to the identification of asbestos fibres. All particles with a length greater than 5 micrometres, less than 3 micrometres in diameter and a length to diameter ratio of 3 to 1 or greater are included in the count. Fibres with diameters less than about 0.3 micrometres cannot be detected using this method regardless of length. This report has been prepared for the sole use of the person or entity to who it is addressed. No other person or entity is entitled to use or rely upon this report without the express written consent of Safetech Environmental Limited and the person or entity to who it is addressed. Any use that a third party makes of this report, or any reliance based on conclusions and recommendations made, are the responsibility of such third parties. SEL accepts no responsibility for damages suffered by third parties as a result of actions based on this report.

Should you have any questions please do not hesitate to call.

Yours very truly,

SAFETECH ENVIRONMENTAL LIMITED

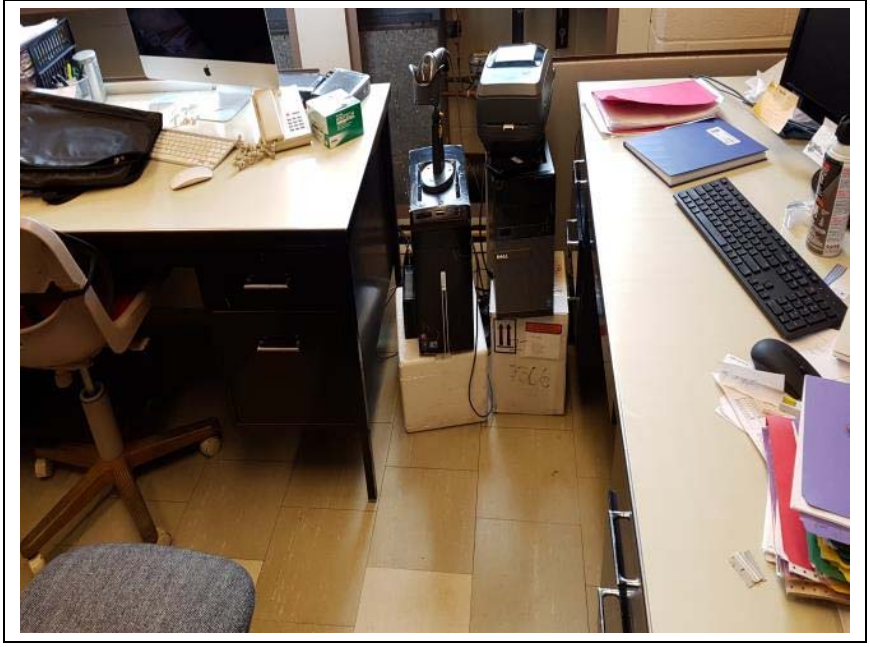
Stephen Choi, B.A.Sc., C.EES, WRT
OH&S Technician

James R. Green, BA, CRSP, AMRT
Project Manager

Appendix A
Site Photographs

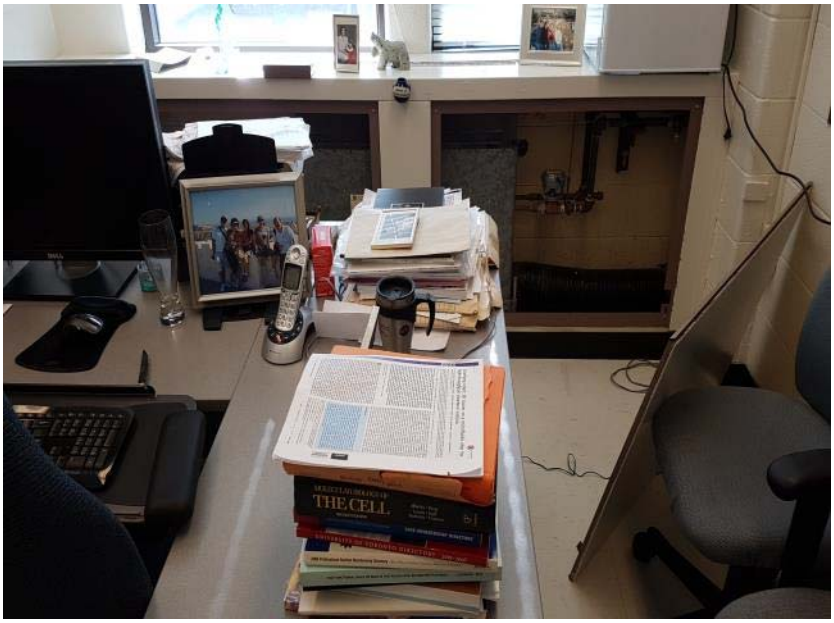
P1 – Room 6360

View of laboratory where asbestos-containing dust was cleaned following Type 2 procedures.



P2 – Room 7366

View of laboratory where asbestos-containing dust was cleaned following Type 2 procedures.



P3 – Room 7368

View of laboratory where asbestos-containing dust was cleaned following Type 2 procedures.

February 27th, 2017

University of Toronto
255 McCaul Street, Level 4
Toronto, Ontario
M5T 1W7

Attn: Mr. Doug Colby, CRSP, AMRT
Coordinator, Hazardous Construction Materials Group

Re: Air Monitoring Report – February 25th, 2017
University of Toronto – Medical Sciences Building
1 King's College Circle, Toronto, Ontario

1.0 BACKGROUND

On February 25th, 2017, Safetech Environmental Limited (SEL) conducted air monitoring services within Room 6334 at the University of Toronto's Medical Sciences Building (MSB) located at 1 King's College Circle, Toronto, Ontario. Air sampling was performed at the request of Mr. Doug Colby, Coordinator, Hazardous Construction Materials Group, for the University of Toronto in order to determine if airborne fibre concentrations were within applicable limits.

Construction dust had reportedly migrated into Room 6334 from an adjacent construction area. As a precautionary measure, the aforementioned room was cleaned up following Type 2 procedures outlined in Ontario Regulation 278/05, "Designated Substance - Asbestos on Construction Projects and in Buildings and Repair Operations", made under the Occupational Health and Safety Act (O.Reg. 278/05).

2.0 METHODOLOGY

One phase contrast microscopy (PCM) air sample was retrieved within each room. The air samples were collected using a 25-mm three-piece filter cassettes containing a 0.8 µm cellulose ester membrane filter and equipped with a 50-mm electrically conductive extension cowl. The filter cassettes were attached to a high volume air sampling pump calibrated with a filter cassette in line to a known flow rate.

The air samples were analyzed in accordance with U.S. National Institute of Occupational Safety and Health (NIOSH) Manual of Analytical Methods, Method 7400, Issue 2: Asbestos and other Fibres by PCM (August 15, 1994), using the asbestos fibre counting rules.

The quantitative working range of this method is 0.04 to 0.5 fibre/cc for a 1000 L air sample. The Limit of Detection (LOD) depends on sample volume and quantity of interfering dust, and is < 0.01 fibre/cc for atmospheres free of interferences. The method gives an index of airborne fibres. Fibres less than approximately 0.25 µm in diameter will not be detected by this method. In addition, other airborne fibres and particles that fall within the counting range criteria may act as possible interferences. Demolition and construction related work areas where high levels of dust are present might overload the membrane and/or interfere with the analysis. As required by NIOSH Method 7400, blank filters were submitted for analysis to ensure that no contamination of the filters occurred during sampling or analytical procedures. Analytical results, as reported in the result table of this report have been field blank corrected.

3.0 RESULTS

PCM air sampling was conducted on February 25th, 2017. Results of subsequent PCM analysis are presented in Table I.

TABLE I
Results of Air Testing
University of Toronto – Medical Sciences Building
1 King's College Circle, Toronto, Ontario
February 25th, 2017

Sample No.	Sample Location	Start Time	Stop Time	Sample Volume (L)	Airborne Fibre Conc. (f/cc)
2017-02-084	Room 6334	8:25 AM	9:32 AM	1005	<0.0023
2017-02-085	Room 6334	8:25 AM	9:32 AM	1005	<0.0023

4.0 CONCLUSIONS

Results of air monitoring on February 25th, 2017, indicated that at the time of sampling, the airborne fibre concentration within Room 6334 of the Medical Sciences Building was well below the occupational exposure limit for asbestos 0.1 fibres/cc. In addition, results of PCM air sampling were below the generally accepted post-abatement standard of 0.01 fibres/cc.

5.0 LIMITATIONS

The investigation, assessments and recommendations detailed in this report were carried out in a manner consistent with the level of care and skill normally exercised by

reasonable members of the environmental and industrial hygiene consulting profession currently practicing under similar conditions in the area. Furthermore, the investigation, assessments and recommendations in this report have been made based on conditions observed at the time of the assessment and are limited to the areas investigated.

In preparing this report, Safetech Environmental Limited (SEL) relied on information supplied by others. Except as expressly set-out in this report, SEL has not made any independent verification of such information.

The analytical method used meets the requirements of O.Reg. 278/05. However, it is important to note that this method is not specific to the identification of asbestos fibres. All particles with a length greater than 5 micrometres, less than 3 micrometres in diameter and a length to diameter ratio of 3 to 1 or greater are included in the count. Fibres with diameters less than about 0.3 micrometres cannot be detected using this method regardless of length.

This report has been prepared for the sole use of the person or entity to who it is addressed. No other person or entity is entitled to use or rely upon this report without the express written consent of Safetech Environmental Limited and the person or entity to who it is addressed. Any use that a third party makes of this report, or any reliance based on conclusions and recommendations made, are the responsibility of such third parties. SEL accepts no responsibility for damages suffered by third parties as a result of actions based on this report.

Should you have any questions regarding this project, please contact our office.
Sincerely,

SAFETECH ENVIRONMENTAL LIMITED

Josh Hamilton
OH&S Technician

James R. Green, BA, CRSP, AMRT
Project Manager

March 1st, 2017

University of Toronto
255 McCaul Street, Level 4
Toronto, Ontario
M5T 1W7

Attn: Mr. Doug Colby, CRSP, AMRT
Coordinator, Hazardous Construction Materials Group

Re: Air Monitoring Report – March 1st, 2017
University of Toronto – Medical Sciences Building
1 King's College Circle, Toronto, Ontario

1.0 BACKGROUND

On March 1st, 2017, Safetech Environmental Limited (SEL) was contacted to provide air monitoring services within Room 6334 at the University of Toronto's Medical Sciences Building located at 1 King's College Circle, Toronto, Ontario. Air sampling was performed at the request of Mr. Doug Colby, Coordinator, Hazardous Construction Materials Group, for the University of Toronto.

Asbestos containing dust had reportedly migrated into the aforementioned room from a previously completed Type 3 asbestos work area. Impacted areas of Room 6334 were subsequently cleaned up following Type 2 procedures outlined in Ontario Regulation 278/05, "Designated Substance - Asbestos on Construction Projects and in Buildings and Repair Operations", made under the Occupational Health and Safety Act (O. Reg. 278/05).

2.0 METHODOLOGY

One phase contrast microscopy (PCM) air sample was retrieved within each room. The air samples were collected using a 25-mm three-piece filter cassettes containing a 0.8 µm cellulose ester membrane filter and equipped with a 50-mm electrically conductive extension cowl. The filter cassettes were attached to a high volume air sampling pump calibrated with a filter cassette in line to a known flow rate.

The air samples were analyzed in accordance with U.S. National Institute of Occupational Safety and Health (NIOSH) Manual of Analytical Methods, Method 7400, Issue 2: Asbestos and other Fibres by PCM (August 15, 1994), using the asbestos fibre counting rules.

The quantitative working range of this method is 0.04 to 0.5 fibre/cc for a 1000 L air sample. The Limit of Detection (LOD) depends on sample volume and quantity of interfering dust, and is < 0.01 fibre/cc for atmospheres free of interferences. The method gives an index of airborne fibres. Fibres less than approximately 0.25 µm in diameter will not be detected by this method. In addition, other airborne fibres and particles that fall within the counting range criteria may act as possible interferences. Demolition and construction related work areas where high levels of dust are present might overload the membrane and/or interfere with the analysis. As required by NIOSH Method 7400, blank filters were submitted for analysis to ensure that no contamination of the filters occurred during sampling or analytical procedures. Analytical results, as reported in the result table of this report have been field blank corrected.

3.0 RESULTS

PCM air sampling was conducted on March 1st, 2017. Results of subsequent PCM analysis are presented in Table I.

TABLE I
Results of Air Testing
University of Toronto – Medical Sciences Building
1 King's College Circle, Toronto, Ontario
Sample Collection Date: March 1st, 2017

Sample No.	Sample Location	Start Time	Stop Time	Sample Volume (L)	Airborne Fibre Conc. (f/cc)
2017-03-002	Room 6334 Adjacent to shaft	11:50 AM	12:57 PM	1005	<0.0027
2017-03-003	Centre of Room 6334	11:50 AM	12:57 PM	1005	<0.0027

4.0 CONCLUSIONS

Results of air monitoring on March 1st, 2017 indicated that at the time of sampling, the airborne fibre concentration within Room 6334 of the Medical Sciences Building was well below the occupational exposure limit for asbestos 0.1 fibres/cc and the generally accepted post abatement standard of 0.01 fibres/cc. In addition, results of PCM air sampling were below the detection limit of NIOSH Method 7400. Based on these results, airborne fibre concentrations within Room 6334 were all within applicable limits.

5.0 LIMITATIONS

The investigation, assessments and recommendations detailed in this report were carried out in a manner consistent with the level of care and skill normally exercised by reasonable members of the environmental and industrial hygiene consulting profession currently practicing under similar conditions in the area. Furthermore, the investigation, assessments and recommendations in this report have been made based on conditions observed at the time of the assessment and are limited to the areas investigated.

In preparing this report, Safetech Environmental Limited (SEL) relied on information supplied by others. Except as expressly set-out in this report, SEL has not made any independent verification of such information.

The analytical method used meets the requirements of O.Reg. 278/05. However, it is important to note that this method is not specific to the identification of asbestos fibres. All particles with a length greater than 5 micrometres, less than 3 micrometres in diameter and a length to diameter ratio of 3 to 1 or greater are included in the count. Fibres with diameters less than about 0.3 micrometres cannot be detected using this method regardless of length.

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Should you have any questions regarding this project, please contact our office.
Sincerely,

SAFETECH ENVIRONMENTAL LIMITED

Josh Hamilton
OH&S Technician

James R. Green, BA, CRSP, AMRT
Project Manager

Results of PCM Air Testing, Settled Dust Sampling and Bulk Sampling for the Determination of Asbestos Content

Room # 6238 and 6334, 1 Kings College Circle, Medical Sciences Building, University of Toronto Toronto, Ontario

Prepared for:

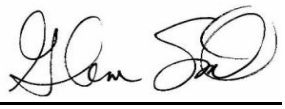
Mr. Doug Colby
Coordinator, Hazardous Construction Materials Group

University of Toronto
255 McCaul Street, Level 4
Toronto, Ontario M5T 1W7

Prepared by:
Safetech Environmental Limited

Josh Hamilton
OH&S Technician

Reviewed by:



D. Glenn Smith, B.Sc. (HE), CRSP, AMRT
Senior Project Manager

SEL Project Number 116217
Date of Issue: March 9, 2017

March 9, 2017

University of Toronto
255 McCaul Street, Level 4
Toronto, Ontario M5T 1W7

Attention: Mr. Doug Colby
Coordinator, Hazardous Construction Materials Group

RE: Results of PCM Air Testing, Settled Dust Sampling and Bulk Sampling for the Determination of Asbestos Content
Room # 6238 and 6334, 1 Kings College Circle, University of Toronto, Toronto, Ontario

1.0 BACKGROUND

On March 7, 2017, personnel from Safetech Environmental Limited (SEL) performed air sampling for airborne fibres (PCM) and sampling of settled dust on specified surfaces within the above noted areas. Sample locations were selected in consultation with Mr. Doug Colby and Laboratory Representatives from the University of Toronto. In addition, Dr. Maria Rozakis-Adcock, Associate Professor, Laboratory Medicine and Pathobiology, provided SEL with two (2) bulk samples to be analyzed for asbestos content. The asbestos bulk samples and settled dust samples were analyzed for the determination of asbestos content within Rooms # 6238 and 6334 of the Medical Sciences Building, Toronto, Ontario. Following sampling, the remediation contractor, Envirosafe, Inc. conducted surface cleaning within Room # 6334 adjacent to the shaft. It was reported that surface cleaning within Room # 6238 was to be completed on March 8, 2017.

PCM air sampling, dust sampling, and the submission of bulk samples were conducted at the request of Mr. Doug Colby on March 7, 2017, in response to ongoing concerns regarding the presence of suspect asbestos-containing dust within Room # 6238, 6334 and equipment stored therein. As such, the objective of our assessment was to determine if asbestos, a designated substance as defined under the Ontario Occupational Health and Safety Act, RSO 1990 c. 0.1, is present in settled dust and air within the aforementioned areas and to assess requirements for any further remedial action, if necessary.

2.0 METHODOLOGY

2.1 PCM Air Testing

Four air samples were collected using 25-mm three-piece filter cassettes containing a 0.8

µm cellulose ester membrane filter and equipped with a 50-mm electrically conductive extension cowl. The filter cassettes were attached to a high volume air sampling pump calibrated with a filter cassette in line to a known flow rate.

At the completion of air testing the samples were analyzed in accordance with U.S. National Institute of Occupational Safety and Health (NIOSH) Manual of Analytical Methods, Method 7400, Issue 2: Asbestos and other Fibres by PCM (August 15, 1994), using the asbestos fibre counting rules. As required by NIOSH Method 7400, field blanks were also analyzed to ensure that no contamination of the filters occurred during sampling or analytical procedures.

The quantitative working range of this method is 0.04 to 0.5 fibre/cc for a 1000 L air sample. The Limit of Detection (LOD) depends on sample volume and quantity of interfering dust, and is <0.01 fibre/cc for atmospheres free of interferences. Fibres less than approximately 0.25 µm in diameter will not be detected by this method. This analytical method gives an index of airborne fibres as it cannot differentiate between asbestos and other fibres. Other airborne particles that fall within the counting range criteria will act as positive interferences. Result of analysis has been field blank corrected and is reported as the concentration of fibres per cubic centimeter of air (f/cc).

2.2 Surface Sampling of Settled Dust - Microvacuum Sampling

Microvacuum sampling and analysis was conducted in accordance with *ASTM D5755-09, "Standard Test Method For Microvacuum Sampling And Indirect Analysis Of Settled Dust By Transmission Electron Microscopy (TEM) for Asbestos Structure Number Surface Loading"* and procedures outlined by Millette and Hays, 1994[1].

The sampling procedure used a modified air sampling cassette as a vacuuming collection device. A personal air sampling pump calibrated to 2 L/min was connected to a 0.45µm pore size 25-mm mixed cellulose ester (MCE) membrane filter cassette via Tygon tubing. The inlet of the cassette was then fitted with a one inch nozzle with the end of the nozzle cut at 45 degrees. A known area of the surface in question was vacuumed until no visible dust was observed or for 2 minutes if no visible dust was present. Upon completion of sampling, the samples were sent to an independent laboratory and analyzed for asbestos levels using *ASTM Standard D5755-09*. This test method positively identifies asbestos fibres from other fibre types in dust and provides an estimate of the surface loading of asbestos in the sampled dust. Results are reported as the number of asbestos structures per unit area of sampled surface (structures/cm^2). Concentrations are based on the number of asbestos structures counted and the area analyzed.

2.3 Bulk Sampling for the Determination of Asbestos Content

Bulk samples of building materials suspected to contain asbestos were submitted by SEL in accordance with Section 3 of O. Reg. 278/05. Two bulk samples of dust were provided to SEL by Dr. Maria Rozakis-Adcock in a labeled sample vile dated March 2, 2017 for transportation to an independent laboratory.

Analysis for asbestos content was performed by the independent laboratory in accordance with the U.S. Environmental Protection Agency (EPA) Test Method EPA/600/R-93-116: Method for the Determination of Asbestos in Bulk Building Materials. June 1993. This method identifies the asbestos fibre content of building materials using polarized light microscopy (PLM) analytical techniques, with confirmation of presence and type of asbestos made by dispersion staining optical microscopy. This analytical method meets the requirements set forth in Section 3 of O. Reg. 278/05.

3.0 RESULTS

3.1 PCM Air Testing

Result of PCM air testing is summarized below in Table 1.

TABLE I
Results of Air Testing
Room # 6238 and 6334, 1 Kings College Circle, Toronto, Ontario
Sample Collection Date: March 7, 2017

Sample No.	Sample Location	Start Time	Stop Time	Sample Volume (L)	Airborne Fibre Conc. (f/cc)
2017-03-016	Room 6334 Adjacent to Shaft Door	3:21 PM	4:28 PM	1005	<0.0026
2017-03-017	Centre of Room 6334	3:21 PM	4:28 PM	1005	<0.0026
2017-03-018	Room 6238 Adjacent to Orbit Shaker	4:35 PM	5:42 PM	1005	<0.0026
2017-03-019	Room 6238 Adjacent to Thermo Controller	4:35 PM	5:42 PM	1005	<0.0026

3.2 Surface Sampling of Settled Dust

Results of settled dust sampling are summarized below in Table 2. Results are summarized according to the concentration of all asbestos structures detected. The Laboratory Certificates of Analysis are included in Appendix A.

TABLE 2
Summary of Analysis for Determination of Asbestos Content in Settled Dust
Microvacuum Sampling
Room # 6238 and 6334, 1 Kings College Circle, Toronto, Ontario
Sample Collection Date: March 7, 2017

Sample No.	Location	Surface	Asbestos Type	All Asbestos Structures (structures/cm^2)
1	Room 6238, Thermal Controller Vent	Vent	Chrysotile L Amphibole	51, 800
2	Room 6238, 2nd Shelf Adjacent to Thermal Controller Vent	Wood Shelf	Chrysotile	<2,730
3	Room 6334 Adjacent to Shaft	Floor	Chrysotile	360,100

3.3 Bulk Sampling for the Determination of Asbestos Content

Results of analysis for the determination of asbestos content are summarized in Table 3. Materials have been classified as “ACM”, “Non-ACM”, “Suspected ACM” or “Presumed Non-ACM” based on analytical results. Materials classified as Suspected ACM or Presumed Non-ACM may require further analysis (depending on site-specific conditions) to verify whether the material should be classified as ACM or Non-ACM. Please refer to the Limitations section of this report for additional details. The Laboratory Certificate of Analysis is attached in Appendix B.

TABLE 3
Bulk Sample Analytical Results of Determination of Asbestos Content
Room # 6238 and 6334, 1 Kings College Circle, Toronto, Ontario
Sample Collection Date: March 7, 2017

Sample No.	Material Description	Sample Location	Asbestos Content	Material Classification
1	Dust	Reported to be Collected within Room 6238, Centrifuge	None Detected	Non-ACM
2	Dust	Reported to be Collected within Room 6238, Centrifuge Filter	None Detected	Non-ACM

4.0 CONCLUSIONS AND RECOMMENDATIONS

4.1 PCM Air Testing

Results of PCM air testing indicated that at the time of sampling, the airborne fibre concentrations within Rooms # 6238 and 6334 were well below the occupational exposure limit for asbestos (0.1 fibres/cc) and the generally accepted post-abatement standard (0.01 fibres/cc). Based on these results, Rooms # 6238 and 6334 are deemed to be safe for general occupancy.

4.2 Surface Sampling of Settled Dust

In Canada, no provincial or federal regulations or guidelines exist with respect to settled dust sampling and interpretation of analytical results. In addition, at present, there is no direct correlation between asbestos structures in settled dust and exposure to human beings. However, a considerable number of studies with respect to settled dust sampling for asbestos using the microvacuum procedure and TEM analysis have been performed[1]. Based on results from these studies typical levels of asbestos in settled dust have been determined for various building conditions. Settled asbestos concentrations are considered to be low if less than 1,000 structures/cm^2 are detected, background if between 1,000 and 10,000 structures/cm^2 are detected, above background if levels are greater than 10,000 structures/cm^2, and high if levels are above 100,000 structures/cm^2. Levels above 100,000 structures/cm^2 are usually associated with an accidental release of asbestos. All of these guidelines are based on total asbestos structures and do not distinguish between fibres/structures greater or less than 5 µm.

Based on analytical results summarized in Table 2, chrysotile and L. Amphibole structures were detected in Sample 1 at “above background” levels (51,800 structures/cm^2) but below levels indicative of an accidental release of asbestos. Chrysotile structures were detected in Sample 2 at “background” levels (<2,730 structures/cm^2) while chrysotile asbestos structures were detected at levels above 100,000 structures/cm^2, which is typically associated with an accidental release of asbestos within Sample 3.

4.3 Bulk Sampling for the Determination of Asbestos Content

As results summarized in Table 3 indicate, asbestos was not detected in samples provided to SEL by Dr. Maria Rozakis-Adcock, Associate Professor, Laboratory Medicine and Pathobiology of dust and debris reported to have been collected from within the Centrifuge stored in Room # 6238.

4.4 Summary

Based on the results noted in Section 4.1, Rooms # 6238 and 6334 are deemed to be safe for general occupancy based on the results of PCM air testing. It should be noted that there is no direct correlation between the presence of asbestos structures in settled dust and the presence of airborne asbestos fibres meaning the presence of asbestos structures in settled dust will not necessarily result in these fibres becoming airborne.

5.0 LIMITATIONS

The information and recommendations detailed in this report were carried out by trained professional and technical staff in accordance with generally accepted environmental and industrial hygiene work practices and procedures. Recommendations provided in this report have been generated in accordance with accepted industry guidelines and practices. These guidelines and practices are considered acceptable as of the date of this report. In preparation of this report, Safetech Environmental Limited (SEL) relied on information including testing services provided by independent laboratories. Except as expressly set out in this report, SEL has not made any independent verification of this information provided by independent entities. The collection of samples at the location noted was consistent with the scope of work agreed-upon with the person or entity to whom this report is addressed and the information obtained concerning prior site investigations. As conditions between samples may vary, the potential remains for the presence of unknown additional contaminants for which there were no known indicators. The analytical method used meets the requirements of O. Reg. 278/05. However, small asbestos fibres may be missed by PLM due to resolution limitations of the optical microscope. Interfering binder/matrix and/or low asbestos content may also hinder positive identification by PLM. These conditions are common for vermiculite attic insulation (VAI) and non-friable organically bound (NOB) materials such as vinyl floor tiles, roofing materials, mastics and caulking and can lead to "false negative" results. If PLM analytical results for these types of materials indicate no asbestos detected they have been reported as "Presumed Non-ACM". Due to limitations of the analytical method we cannot confirm that low quantities of asbestos are not present in these samples using solely PLM analysis. Additional analytical procedures should be considered for such materials to rule out false negative results. Table 1 of Ontario Regulation 278/05 indicates the required minimum number of bulk material samples to be collected from a homogeneous material. Depending on the type of material and size of area, typically 3, 5 or 7 samples should be analyzed and all deemed as negative (i.e. less than 0.5% asbestos) prior to confirming that the material sampled is non-asbestos. A single negative sample result is not considered to be sufficient evidence to confirm a material to be non-asbestos-containing.

Conclusions are based on site conditions at the time of inspection and can only be extrapolated to an undefined limited area around inspected locations. The extent of the limited area depends on building construction and conditions. SEL cannot warrant against undiscovered environmental liabilities. If any information becomes available that differs from the findings in this report, we request that we be notified immediately to reassess the conclusions provided herein. This report has been prepared for the sole use of the person or entity to who it is addressed. No other person or entity is entitled to use or rely upon this report without the express written consent of Safetech Environmental Limited and the person or entity to who it is addressed. Any use that a third party makes of this report, or any reliance based on conclusions and recommendations made, are the responsibility of such third parties. SEL accepts no responsibility for damages suffered by third parties as a result of actions based on this report.

References: [1] Millette, J.R. and S.M. Hays, Settled Asbestos Dust Sampling and Analysis, Lewis Publishers, London, 1994, pp: 49-51

Appendix A

Laboratory Certificate of Analysis – Microvacuum Sampling

EMSL Canada Inc.

2756 Slough Street Mississauga, ON L9T 5N4
Phone/Fax: (289) 997-4602 / (289) 997-4607
http://www.EMSL.com / torontolab@emsl.com

EMSL Canada Order:	551702311
Customer ID:	55SELI62
Customer PO:	116217
Project ID:	

Attention:	Josh Hamilton Safetech Environmental 3045 Southcreek Road Unit 14 Mississauga, ON L4X 2X7	**Phone:**	(647) 964-8301
		Fax:	(905) 624-4306
		Received Date:	03/07/2017 6:46 PM
		Analysis Date:	03/08/2017
		Collected Date:	03/07/2017
Project:	University of Toronto Medical Sciences Building/116217		

Test Report: Asbestos Analysis via Transmission Electron Microscopy ASTM Method D5755

Sample ID	Area Sampled (cm^2)	Asbestos Type	Asbestos Structures	Sensitivity (str/cm^2)	Concentration (str/cm^2)	Comments
S1: Room 6238 Thermo controller Vent 551702311-0001	100	Chrysotile L. Amphibole	57	909	51800	
S2: Room 6238 2nd Shelf adjacent to Thermo 551702311-0002	100	Chrysotile	<3	909	<2730	
S3: Room 6334 Adjacent to Vault 551702311-0003	100	Chrysotile	108	3330	360000	Due to excessive particulate the analytical sensitivity of 1000 str/cm^2 as required by the method was not reached

Analyst(s):

Natalie D'Amico (3)

Matthew Davis
or other approved signatory

Report amended: 03/08/2017 16:43:16 Replaces initial report from: 03/08/2017 14:51:48 Reason Code: Data Entry-Change to Sample ID

Appendix B

Laboratory Certificate of Analysis – Asbestos Bulk Sampling

EMSL Canada Inc.

2756 Slough Street Mississauga, ON L9T 5N4
Phone/Fax: 289-997-4602 / (289) 997-4607
http://www.EMSL.com / torontolab@emsl.com

EMSL Canada Order 551702312
Customer ID: 55SELI62
Customer PO: 116217
Project ID:

Attn: Josh Hamilton
Safetech Environmental
3045 Southcreek Road
Unit 14
Mississauga, ON L4X 2X7

Phone: (905) 624-2722
Fax: (905) 624-4306
Collected:
Received: 3/07/2017
Analyzed: 3/07/2017

Proj: University of Toronto Medical Sciences Building/116217

Test Report: Asbestos Analysis of Bulk Materials for Ontario Regulation 278/05 via EPA600/R-93/116 Method

Client Sample ID: S1 ***Lab Sample ID:*** **551702312-0001**

Sample Description: ROOM 6238 - CENTRIFUGE

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	3/07/2017	Gray	90%	10%	None Detected	

Client Sample ID: S2 ***Lab Sample ID:*** **551702312-0002**

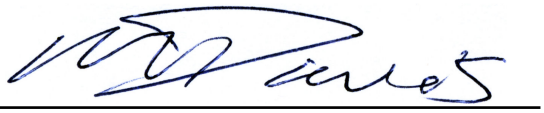
Sample Description: ROOM 6238 - CENTRIFUGE FILTER

TEST	Analyzed Date	Color	Non-Asbestos Fibrous	Non-Fibrous	Asbestos	Comment
PLM	3/07/2017	Gray	90%	10%	None Detected	

Analyst(s):

Romeo Samson PLM (2)

Reviewed and approved by:



Matthew Davis
or Other Approved Signatory

None Detected = <0.1%. EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. Samples received in good condition unless otherwise noted. This report must not be used to claim product endorsement by NVLAP of any agency of the U.S. Government.

Samples analyzed by EMSL Canada Inc. Mississauga, ON NVLAP Lab Code 200877-0

Report amended: 03/08/201710:24:26 Replaces initial report from: 03/08/201709:36:36 Reason Code: Client-Change to Project

March 22nd, 2017

University of Toronto
255 McCaul Street, Level 4
Toronto, Ontario
M5T 1W7

Attn: Mr. Irfan Miraj, P.Eng. MHSc.
Manager, Hazard Construction Materials Group

Re: Air Monitoring Report – March 20th and 21st, 2017
University of Toronto – Medical Sciences Building, Room 3336B
1 King's College Circle, Toronto, Ontario

1.0 BACKGROUND

On March 20thand 21st, 2017, Safetech Environmental Limited (SEL) was contacted to provide a visual inspection and air monitoring services within Room 3336B at the University of Toronto's Medical Sciences Building located at 1 King's College Circle, Toronto, Ontario. Air sampling was performed at the request and in the presence of Mr. Doug Colby, Coordinator, Hazardous Construction Materials Group, for the University of Toronto.

Asbestos containing dust had reportedly been found within the Office (Room 3336B) following renovation activities. Concerns were raised by user groups regarding the potential for elevated levels of asbestos. As such, air samples were collected within the aforementioned affected area on March 20th, 2017 and March 21st, 2017 following the completion of cleanup activities.

Upon completion of removal and final cleaning procedures, a post-abatement visual inspection was conducted. The objective of this visual inspection was to verify that all designated asbestos-containing materials were removed as outlined in the reported scope of work and to ensure that designated work area was adequately cleaned of visible dust or debris that may contain asbestos.

2.0 METHODOLOGY

2.1 Air Monitoring for Airborne Fibres

Three phase contrast microscopy (PCM) air samples was retrieved within the Office and Laboratory. The air samples were collected using a 25-mm three-piece filter cassettes containing a 0.8 µm cellulose ester membrane filter and equipped with a 50-mm

electrically conductive extension cowl. The filter cassettes were attached to a high volume air sampling pump calibrated with a filter cassette in line to a known flow rate.

The air sampling pumps were calibrated to a flow rate of 15 litres per minute. The air samples were collected using a 25 mm three piece cassette with 50 mm electrically conductive extension cowl and mixed cellulose ester filter, 0.8 µm (recommended 0.45 to 1.2 in method) effective pore size, and back-up pad. The air samples were analyzed in accordance with U.S. National Institute of Occupational Safety and Health (NIOSH) Manual of Analytical Methods, Method 7400, Issue 2: Asbestos and other Fibres by PCM (August 15, 1994), using the asbestos fibre counting rules.

The quantitative working range of this method is 0.04 to 0.5 fibre/cc for a 1000 L air sample. The Limit of Detection (LOD) depends on sample volume and quantity of interfering dust, and is < 0.01 fibre/cc for atmospheres free of interferences. The method gives an index of airborne fibres. Fibres less than approximately 0.25 µm in diameter will not be detected by this method. In addition, other airborne fibres and particles that fall within the counting range criteria may act as possible interferences. Demolition and construction related work areas where high levels of dust are present might overload the membrane and/or interfere with the analysis.

3.0 RESULTS

3.1 Air Monitoring for Airborne Fibres

PCM air sampling was conducted on March 20th and 21st, 2017. Results of subsequent PCM analysis are presented in Table I.

TABLE I
Results of Air Testing
University of Toronto – Medical Sciences Building
1 King's College Circle, Toronto, Ontario
March 20th and 21st, 2017

Sample No.	Sample Location	Start Time	Stop Time	Sample Volume (L)	Airborne Fibre Conc. (f/cc)
2017-03-166	Office (Room 3336B)	12:50	14:02	1080	0.003
2017-03-186	Office (Room 3336B)	16:00	17:40	1500	0.002
2017-03-187	Lab (3336)	16:02	17:42	1500	0.002

4.0 CONCLUSIONS

Results of our post-abatement visual inspection verified that all designated asbestos-containing dust had been removed from within Room 3336B. In addition, no visible dust or debris associated with the abatement was observed within the designated work area.

Results of air monitoring on March 20th and 21st, 2017 indicated that at the time of sampling, the airborne fibre concentration within Room 3336B of the Medical Sciences Building was well below the occupational exposure limit for asbestos 0.1 fibres/cc. In addition, results of PCM air sampling were below the generally accepted clearance standard of 0.01 fibres/cc, thus the subject location would be expected to be safe for general occupancy.

5.0 LIMITATIONS

The investigation, assessments and recommendations detailed in this report were carried out in a manner consistent with the level of care and skill normally exercised by reasonable members of the environmental and industrial hygiene consulting profession currently practicing under similar conditions in the area. Furthermore, the investigation, assessments and recommendations in this report have been made based on conditions observed at the time of the assessment and are limited to the areas investigated.

In preparing this report, Safetech Environmental Limited (SEL) relied on information supplied by others. Except as expressly set-out in this report, SEL has not made any independent verification of such information.

The analytical method used meets the requirements of O. Reg. 278/05. However, it is important to note that this method is not specific to the identification of asbestos fibres. All particles with a length greater than 5 micrometres, less than 3 micrometres in diameter and a length to diameter ratio of 3 to 1 or greater are included in the count. Fibres with diameters less than about 0.3 micrometres cannot be detected using this method regardless of length.

This report has been prepared for the sole use of the person or entity to who it is addressed. No other person or entity is entitled to use or rely upon this report without the express written consent of Safetech Environmental Limited and the person or entity to who it is addressed. Any use that a third party makes of this report, or any reliance based on conclusions and recommendations made, are the responsibility of such third parties. SEL accepts no responsibility for damages suffered by third parties as a result of actions based on this report.

Should you have any questions regarding this project, please contact our office.
Sincerely,

SAFETECH ENVIRONMENTAL LIMITED

Josh Hamilton
OH&S Technician

Michael Mitanis, B.A.Sc. (OH&S)
Project Manager

P1 – 3336B

Representative view of area following cleanup.

March 22nd, 2017

University of Toronto
255 McCaul Street, Level 4
Toronto, Ontario
M5T 1W7

Attn: Mr. Irfan Miraj, P.Eng. MHSc.
Manager, Hazard Construction Materials Group

Re: Air Monitoring Report – March 21st, 2017
University of Toronto – Medical Sciences Building, Room 6360A
1 King's College Circle, Toronto, Ontario

1.0 BACKGROUND

On March 21st, 2017, Safetech Environmental Limited (SEL) was contacted to provide a visual inspection and air monitoring services within Room 6360A at the University of Toronto's Medical Sciences Building located at 1 King's College Circle, Toronto, Ontario. SEL's services were performed at the request and in the presence of Mr. Doug Colby, Coordinator, Hazardous Construction Materials Group, for the University of Toronto.

Asbestos containing dust had reportedly been found within the Office (6360A) following renovation activities. Concerns were raised by user groups regarding the potential for elevated levels of asbestos. As such, an air sample was collected within the aforementioned affected area on March 21st, 2017 following the completion of Type 2 abatement procedures. Upon completion cleaning procedures, a post-abatement visual inspection was conducted. The objective of this visual inspection was to verify that the designated work area was adequately cleaned of visible dust or debris that may contain asbestos.

2.0 METHODOLOGY

2.1 Air Monitoring for Airborne Fibres

One phase contrast microscopy (PCM) air sample was retrieved within the Office (Room 6260A). The air sample was collected using a 25-mm three-piece filter cassettes containing a 0.8 µm cellulose ester membrane filter and equipped with a 50-mm electrically conductive extension cowl. The filter cassette was attached to a high volume air sampling pump calibrated with a filter cassette in line to a known flow rate.

The air sampling pumps was calibrated to a flow rate of 15 litres per minute. The air sample was collected using a 25 mm three piece cassette with 50 mm electrically conductive extension cowl and mixed cellulose ester filter, 0.8 µm (recommended 0.45 to 1.2 in method) effective pore size, and back-up pad. The air sample was analyzed in accordance with U.S. National Institute of Occupational Safety and Health (NIOSH) Manual of Analytical Methods, Method 7400, Issue 2: Asbestos and other Fibres by PCM (August 15, 1994), using the asbestos fibre counting rules.

The quantitative working range of this method is 0.04 to 0.5 fibre/cc for a 1000 L air sample. The Limit of Detection (LOD) depends on sample volume and quantity of interfering dust, and is < 0.01 fibre/cc for atmospheres free of interferences. The method gives an index of airborne fibres. Fibres less than approximately 0.25 µm in diameter will not be detected by this method. In addition, other airborne fibres and particles that fall within the counting range criteria may act as possible interferences. Demolition and construction related work areas where high levels of dust are present might overload the membrane and/or interfere with the analysis.

3.0 RESULTS

3.1 Air Monitoring for Airborne Fibres

PCM air sampling was conducted on March 21st, 2017. Results of subsequent PCM analysis are presented in Table I.

TABLE I
Results of Air Testing
University of Toronto – Medical Sciences Building
1 King's College Circle, Toronto, Ontario
March 21st, 2017

Sample No.	Sample Location	Start Time	Stop Time	Sample Volume (L)	Airborne Fibre Conc. (f/cc)
2017-03-190	Office (Room 6360A)	17:00	18:17	77	0.004

4.0 CONCLUSIONS

Results of our post-abatement visual inspection verified that all designated asbestos-containing dust had been removed from within Room 6360A. In addition, no visible dust or debris associated with the abatement was observed within the designated work area. Results of air monitoring on March 21st, 2017 indicated that at the time of sampling, the airborne fibre concentration within Room 6360A of the Medical Sciences Building was well below the occupational exposure limit for asbestos 0.1 fibres/cc. In addition, results of PCM air sampling were below the generally accepted clearance standard of 0.01 fibres/cc, thus the subject location would be expected to be safe for general occupancy.

5.0 LIMITATIONS

The investigation, assessments and recommendations detailed in this report were carried out in a manner consistent with the level of care and skill normally exercised by reasonable members of the environmental and industrial hygiene consulting profession currently practicing under similar conditions in the area. Furthermore, the investigation, assessments and recommendations in this report have been made based on conditions observed at the time of the assessment and are limited to the areas investigated.

In preparing this report, Safetech Environmental Limited (SEL) relied on information supplied by others. Except as expressly set-out in this report, SEL has not made any independent verification of such information.

The analytical method used meets the requirements of O. Reg. 278/05. However, it is important to note that this method is not specific to the identification of asbestos fibres. All particles with a length greater than 5 micrometres, less than 3 micrometres in diameter and a length to diameter ratio of 3 to 1 or greater are included in the count. Fibres with diameters less than about 0.3 micrometres cannot be detected using this method regardless of length.

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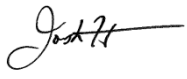
Should you have any questions regarding this project, please contact our office.
Sincerely,

SAFETECH ENVIRONMENTAL LIMITED



Josh Hamilton
OH&S Technician

Michael Mitanis, B.A.Sc. (OH&S)
Project Manager

P1 – 6360A

View of enclosure leading to work area.

P2 – 6360A

All surfaces were noted to be free of dust and debris.

March 27th, 2017

University of Toronto
255 McCaul Street, Level 4
Toronto, Ontario
M5T 1W7

Attn: Mr. Doug Colby, CRSP, AMRT
Coordinator, Hazardous Construction Materials Group

Re: Air Monitoring Report – March 24th, 2017
University of Toronto – Medical Sciences Building, Room 6238
1 King's College Circle, Toronto, Ontario

1.0 BACKGROUND

On March 24th, 2017, Safetech Environmental Limited (SEL) was contacted to provide a visual inspection and air monitoring services within Room 6238 at the University of Toronto's Medical Sciences Building located at 1 King's College Circle, Toronto, Ontario. Air sampling was performed at the request of Mr. Doug Colby, Coordinator, Hazardous Construction Materials Group, for the University of Toronto.

Asbestos containing dust was previously found in Room 6334. Occupants expressed concerns regarding Room 6238 after equipment previously stored in Room 6334 had been moved to Room 6238. As such an air sample was collected within the aforementioned affected area on March 24th, 2017 following the completion of Type 2 abatement procedures. Upon completion of cleaning procedures, a post-abatement visual inspection was conducted. The objective of this visual inspection was to verify that the designated work area was adequately cleaned of visible dust or debris that may contain asbestos.

2.0 METHODOLOGY

2.1 Air Monitoring for Airborne Fibres

One phase contrast microscopy (PCM) air sample was retrieved within the Laboratory (Room 6238). The air sample was collected using a 25-mm three-piece filter cassettes containing a 0.8 µm cellulose ester membrane filter and equipped with a 50-mm electrically conductive extension cowl. The filter cassette was attached to a high volume air sampling pump calibrated with a filter cassette in line to a known flow rate.

The air sampling pump was calibrated to a flow rate of 15 litres per minute. The air sample was collected using a 25 mm three piece cassette with 50 mm electrically conductive extension cowl and mixed cellulose ester filter, 0.8 µm (recommended 0.45 to 1.2 in method) effective pore size, and back-up pad. The air sample was analyzed in accordance with U.S. National Institute of Occupational Safety and Health (NIOSH) Manual of Analytical Methods, Method 7400, Issue 2: Asbestos and other Fibres by PCM (August 15, 1994), using the asbestos fibre counting rules.

The quantitative working range of this method is 0.04 to 0.5 fibre/cc for a 1000 L air sample. The Limit of Detection (LOD) depends on sample volume and quantity of interfering dust, and is < 0.01 fibre/cc for atmospheres free of interferences. The method gives an index of airborne fibres. Fibres less than approximately 0.25 µm in diameter will not be detected by this method. In addition, other airborne fibres and particles that fall within the counting range criteria may act as possible interferences. Demolition and construction related work areas where high levels of dust are present might overload the membrane and/or interfere with the analysis.

3.0 RESULTS

3.1 Air Monitoring for Airborne Fibres

PCM air sampling was conducted on March 24th, 2017. Results of subsequent PCM analysis are presented in Table I.

TABLE I
Results of Air Testing
University of Toronto – Medical Sciences Building
1 King's College Circle, Toronto, Ontario
March 24th, 2017

Sample No.	Sample Location	Start Time	Stop Time	Sample Volume (L)	Airborne Fibre Conc. (f/cc)
2017-03-238	Laboratory (Room 6238)	18:09	19:21	1080	0.002

4.0 CONCLUSIONS

Results of our post-abatement visual inspection verified that all designated asbestos-containing dust had been removed from within Room 6238. In addition, no visible dust or debris associated with the abatement was observed within the designated work area. Results of air monitoring on March 24th, 2017 indicated that at the time of sampling, the airborne fibre concentration within Room 6238 of the Medical Sciences Building was well below the occupational exposure limit for asbestos 0.1 fibres/cc. In addition, results

of PCM air sampling were below the generally accepted clearance standard of 0.01 fibres/cc, thus the subject location would be expected to be safe for general occupancy.

5.0 LIMITATIONS

The investigation, assessments and recommendations detailed in this report were carried out in a manner consistent with the level of care and skill normally exercised by reasonable members of the environmental and industrial hygiene consulting profession currently practicing under similar conditions in the area. Furthermore, the investigation, assessments and recommendations in this report have been made based on conditions observed at the time of the assessment and are limited to the areas investigated.

In preparing this report, Safetech Environmental Limited (SEL) relied on information supplied by others. Except as expressly set-out in this report, SEL has not made any independent verification of such information.

The analytical method used meets the requirements of O.Reg. 278/05. However, it is important to note that this method is not specific to the identification of asbestos fibres. All particles with a length greater than 5 micrometres, less than 3 micrometres in diameter and a length to diameter ratio of 3 to 1 or greater are included in the count. Fibres with diameters less than about 0.3 micrometres cannot be detected using this method regardless of length.

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Should you have any questions regarding this project, please contact our office.
Sincerely,

SAFETECH ENVIRONMENTAL LIMITED

Josh Hamilton
OH&S Technician

Glenn Smith, BA, CRSP, AMRT
Senior Project Manager

P1 – Room 6238

Representative view of area following cleanup.