



April 10, 2017

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

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

**Re: Results of PCM and TEM Air Monitoring Program
April 2-7, 2017
University of Toronto – Medical Sciences Building
1 King’s College Circle, Toronto, Ontario**

1.0 INTRODUCTION

Safetech Environmental Limited (SEL) has been retained from April 2 to April 7, 2017 to provide air monitoring services for the University of Toronto’s Medical Sciences Building located at 1 King’s College Circle, Toronto, Ontario M5S 1A8. Air sampling has been performed at the request of Mr. Irfan Miraj, Manager, Hazardous Construction Materials Group, to determine if airborne asbestos fibre concentrations are within acceptable and applicable limits. This report provides and detail of air sampling conducted from April 2-7, 2017.

From April 2 to April 7, SEL has collected a total of 73 representative samples, 10 location specific samples and 10 outdoor samples:

- Representative samples refer to locations that were uniformly selected and also upon occupant request. These “building-wide” air samples provide an overview of air quality with regard to airborne fibres.
- Location samples refer to samples taken pre- and post-asbestos clean-up in locations where asbestos-containing dust (>0.5%) were present.
- Outdoor reference samples were collected because asbestos fibres are naturally occurring.

2.0 SUMMARY OF CONCLUSIONS

The Medical Sciences Building air quality is not being negatively impacted by the presence of asbestos-containing building materials existing within the building. The building is deemed to be safe for general occupancy. In addition, although construction related work is being conducted at various locations within the Medical Sciences Building it does not appear that airborne fibres are being drawn into the heating, ventilation and air conditioning systems and negatively impacting the quality of air.

SEL has based above conclusions on the facts briefly described below:

- Of the 73 representative samples 72 samples indicate that at the time of sampling the airborne fiber concentrations were well below the TWA (time weighted average) of 0.1 fibers per cubic centimeter (f/cc), in accordance with Ontario Regulation 490/09, Designated Substances and also below 50% TWA; an action level followed by SEL. 1 sample collected inside Room # 7366 (dated April 3, 2017) indicated that at the time of sampling airborne fiber concentrations was equal to 0.076 f/cc which is above the 50% TWA SEL action level. This sample was analyzed by Transmission Electron Microscope which identified “No” asbestos fibres to be present. Out of an abundance of caution, 5 other samples collected within Room #'s 7366, 7366a and 7366b which were still below the 50% of the TWA were also analyzed by Transmission Electron Microscope. Of these 5 samples only 1.0 chrysotile asbestos fibre was detected to be present.
- All 10 location specific samples indicate that at the time of sampling the airborne fiber concentrations were well below the TWA (time weighted average) of 0.1f/cc, in accordance with Ontario Regulation 490/09, Designated Substances and also below 50% TWA; an action level followed by SEL.
- All 10 outdoor samples also indicated that at the time of sampling the airborne fiber concentrations were well below 0.1f/cc.

Please refer to Appendix A & B for detailed spread sheets and technical reports of aforementioned samples. As explained in next section (3.1), other non-asbestos fibres and particles may interfere and result in higher fibre counts. Therefore the results shown in Appendix A do not reflect airborne concentrations of asbestos alone but for the purpose of this assessment, it is compared to the TWA for asbestos. Actual airborne asbestos fibre concentration may be lower than the values in Appendix A.

3.0 METHODOLOGY

3.1 Air Monitoring for Airborne Fibres

Phase contrast microscopy (PCM) air samples were retrieved within designated locations. 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 approximately 15 litres per minute. The air samples were collected using 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. 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.

3.2 Transmission Electron Microscopy

Where PCM results indicate airborne fibres to be greater than 50% of the TWA, a secondary analysis of air samples was conducted using NIOSH Method 7402, Issue 2: Asbestos by TEM (August 15, 1994). This method is used to determine asbestos fibres in the optically visible range and has the ability to distinguish asbestos fibres from other types of fibres (e.g. clothing fibres). It is intended to complement the results obtained by phase contrast microscopy (NIOSH Method 7400).

In accordance with this method, a sample is analyzed at a magnification of 10,000 times. Only fibres with an aspect ratio of >3:1 and only those fibres greater than 5 µm in length are counted. The quantitative working range of this method is 0.04 to 0.5 fibres per cubic centimetre (f/cc) for a 1000 litre (L) air sample. The Limit of Detection (LOD) depends on sample volume and quantity of interfering dust, and is < 0.01 fibres per cubic centimetre (f/cc) for atmospheres free of interferences. Other amphibole particles that have asbestos ratios greater than 3:1 and elemental compositions similar to the asbestos minerals may interfere in the TEM analysis. Some non-amphibole minerals may give electron diffraction patterns similar to amphiboles. High concentrations of background dust may also interfere with fibre identification.

4.0 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



D. Glenn Smith, BA, CRSP, AMRT
Senior Project Manager

Appendices:

- Appendix A – PCM Air Sample Spreadsheets – SEL
- Appendix B – Location Specific Technical Reports
- Appendix C – TEM Laboratory Certificate of Analysis
- Appendix D – Pump Calibration Sheets
- Appendix E – PCM Analysis Example Calculation Sheet

Appendix A

PCM AIR SAMPLE SPREADSHEET-SEL

Phase Contrast Microscopy Air Sampling Program, Medical Sciences Building, Floor 7, University of Toronto, April 7, 2017

Floor	Room	Description	Sample Location	Sample Number	Pump Number	Litres Per Minute	Time On	Time Off	Duration	Total Litres	Total Fibres	Results f/cc	Analyst	Within Acceptable Limits	Comments
7	7342B	Office	Central	2017-04-391	1	15.01	10:09	11:30	81	1216	14.5	0.005	SC/GS	Yes	Occupied.
7	7366	Lab	Central	2017-04-402	1	15.01	13:00	15:54	174	2612	10	0.002	SC/GS	Yes	Occupied.
7	7366A	Office	Central	2017-04-403	4	15.06	13:03	15:58	175	2636	8.5	0.001	SC/GS	Yes	Occupied.
7	7366B	Office	Central	2017-04-404	5	15.02	13:05	16:01	176	2644	7.5	0.001	SC/GS	Yes	Occupied.
	Exterior Control	NA	North of Medical Sciences Building	2017-04-410	3	15.01	14:48	16:15	87	1306	3	0.001	SC/GS	Yes	Exterior sample for comparison.
	Exterior Control	NA	South of Medical Sciences Building	2017-04-411	6	14.91	14:52	16:21	89	1327	2	0.001	SC/GS	Yes	Exterior sample for comparison.
6	Field blank	NA	NA	2017-04-412	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-413	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-414	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-415	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.

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Interpretation of Results

- 1) Within Ontario, the Occupational Health and Safety Act - Ontario Regulation 490/09 Designated Substances adopts the ACGIH TWA of 0.1 fibres/cc.
- 2) For each area tested compare the "Results f/cc" column to your area and how it compares to the above noted regulation.



Phase Contrast Microscopy Air Sampling Program, Medical Sciences Building, Floor 4, University of Toronto, April 7, 2017

Floor	Room	Description	Sample Location	Sample Number	Pump Number	Litres Per Minute	Time On	Time Off	Duration	Total Litres	Total Fibres	Results f/cc	Analyst	Within Acceptable Limits	Comments
4	4377	Lab	Central	2017-04-400	2	15.04	12:01	13:53	112	1684	2	0.001	SC/GS	Yes	Not Occupied.
4	4381	Lab	Central	2017-04-401	3	15.01	12:07	14:00	113	1696	4	0.001	SC/GS	Yes	Not Occupied.
4	4379	Lab	Central	2017-04-409	2	15.04	13:58	15:25	87	1308	2	0.001	SC/GS	Yes	Occupied.
	Exterior Control	NA	North of Medical Sciences Building	2017-04-410	3	15.01	14:48	16:15	87	1306	3	0.001	SC/GS	Yes	Exterior sample for comparison.
	Exterior Control	NA	South of Medical Sciences Building	2017-04-411	6	14.91	14:52	16:21	89	1327	2	0.001	SC/GS	Yes	Exterior sample for comparison.
6	Field blank	NA	NA	2017-04-412	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-413	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-414	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-415	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.

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2) For each area tested compare the "Results f/cc" column to your area and how it compares to the above noted regulation.



Phase Contrast Microscopy Air Sampling Program, Medical Sciences Building, Floor 3, University of Toronto, April 7, 2017

Floor	Room	Description	Sample Location	Sample Number	Pump Number	Litres Per Minute	Time On	Time Off	Duration	Total Litres	Total Fibres	Results f/cc	Analyst	Within Acceptable Limits	Comments
3	3280	Lab	Central	2017-04-396	6	14.91	11:07	13:11	124	1849	4	0.001	SC/GS	Yes	Occupied.
3	3284	Lab	Central	2017-04-397	7	15.03	11:10	13:14	124	1864	5	0.001	SC/GS	Yes	Occupied.
3	3377	Lab	Central	2017-04-398	8	14.93	11:17	13:19	122	1821	4	0.001	SC/GS	Yes	Occupied.
3	3381	Lab	Central	2017-04-399	9	15.04	11:23	13:22	119	1790	3	0.001	SC/GS	Yes	Occupied.
3	3383	Lab	Central	2017-04-405	6	14.91	13:30	14:43	73	1088	2	0.001	SC/GS	Yes	Not Occupied.
3	3379	Lab	Central	2017-04-406	7	15.03	13:35	15:15	100	1503	3.5	0.001	SC/GS	Yes	Occupied.
3	3382	Lab	Central	2017-04-407	8	14.93	13:43	15:18	95	1418	4	0.001	SC/GS	Yes	Not Occupied.
3	3378	Student Lounge	Central	2017-04-408	9	15.04	13:49	15:22	93	1399	7	0.002	SC/GS	Yes	Occupied.
	Exterior Control	NA	North of Medical Sciences Building	2017-04-410	3	15.01	14:48	16:15	87	1306	3	0.001	SC/GS	Yes	Exterior sample for comparison.
	Exterior Control	NA	South of Medical Sciences Building	2017-04-411	6	14.91	14:52	16:21	89	1327	2	0.001	SC/GS	Yes	Exterior sample for comparison.
6	Field blank	NA	NA	2017-04-412	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-413	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-414	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-415	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.

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Interpretation of Results

1) Within Ontario, the Occupational Health and Safety Act - Ontario Regulation 490/09 Designated Substances adopts the ACGIH TWA of 0.1 fibres/cc.

2) For each area tested compare the "Results f/cc" column to your area and how it compares to the above noted regulation.

Phase Contrast Microscopy Air Sampling Program, Medical Sciences Building, Floor 2, University of Toronto, April 7, 2017

Floor	Room	Description	Sample Location	Sample Number	Pump Number	Litres Per Minute	Time On	Time Off	Duration	Total Litres	Total Fibres	Results f/cc	Analyst	Within Acceptable Limits	Comments
2	2379	Lab	Central	2017-04-392	2	15.04	10:22	11:42	80	1203	3	0.001	SC/GS	Yes	Occupied.
2	2382	Lab	Central	2017-04-393	3	15.01	10:27	11:45	78	1171	2	0.001	SC/GS	Yes	Not Occupied.
2	2284	Lab	Central	2017-04-394	4	15.06	10:31	11:54	83	1250	4	0.001	SC/GS	Yes	Not Occupied.
2	2281	Lab	Central	2017-04-395	5	15.02	10:35	11:49	74	1111	4.5	0.002	SC/GS	Yes	Occupied.
	Exterior Control	NA	North of Medical Sciences Building	2017-04-410	3	15.01	14:48	16:15	87	1306	3	0.001	SC/GS	Yes	Exterior sample for comparison.
	Exterior Control	NA	South of Medical Sciences Building	2017-04-411	6	14.91	14:52	16:21	89	1327	2	0.001	SC/GS	Yes	Exterior sample for comparison.
6	Field blank	NA	NA	2017-04-412	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-413	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-414	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-415	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.

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Interpretation of Results

1) Within Ontario, the Occupational Health and Safety Act - Ontario Regulation 490/09 Designated Substances adopts the ACGIH TWA of 0.1 fibres/cc.

2) For each area tested compare the "Results f/cc" column to your area and how it compares to the above noted regulation.



Phase Contrast Microscopy Air Sampling Program, Medical Sciences Building, Floor 6, University of Toronto, April 6, 2017

Floor	Room	Description	Sample Location	Sample Number	Pump Number	Litres Per Minute	Time On	Time Off	Duration	Total Litres	Total Fibres	Results f/cc	Analyst	Within Acceptable Limits	Comments
7	7366	Lab	Central	2017-04-375	1	15.04	11:33	14:33	180	2707	6	0.001	SC/GS	Yes	Occupied
7	7366A	Office	Central	2017-04-376	2	15.03	11:38	14:35	177	2660	11.5	0.002	SC/GS	Yes	Occupied
7	7366B	Office	Central	2017-04-377	3	15.03	11:40	14:40	180	2705	27.5	0.004	SC/GS	Yes	Occupied
	Exterior Control	NA	South of Medical Sciences Building	2017-04-385	1	15.06	14:48	15:55	67	1009	2	0.001	SC/GS	Yes	Exterior sample for comparison.
	Exterior Control	NA	North of Medical Sciences Building	2017-04-386	2	15.03	14:53	16:00	67	1007	3	0.001	SC/GS	Yes	Exterior sample for comparison.
6	Field blank	NA	NA	2017-04-387	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-388	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-389	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-390	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.

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Interpretation of Results

- 1) Within Ontario, the Occupational Health and Safety Act - Ontario Regulation 490/09 Designated Substances adopts the ACGIH TWA of 0.1 fibres/cc.
- 2) For each area tested compare the "Results f/cc" column to your area and how it compares to the above noted regulation.



Phase Contrast Microscopy Air Sampling Program, Medical Sciences Building, Floor 5, University of Toronto, April 6, 2017

Floor	Room	Description	Sample Location	Sample Number	Pump Number	Litres Per Minute	Time On	Time Off	Duration	Total Litres	Total Fibres	Results f/cc	Analyst	Within Acceptable Limits	Comments
5	5216B	Office	Central	2017-04-372	4	14.96	10:46	12:43	117	1750	4	0.001	SC/GS	Yes	Not Occupied.
5	5326	Lab	Central	2017-04-373	5	15.04	10:59	12:47	108	1624	4.5	0.001	SC/GS	Yes	Not Occupied.
5	5345	Equipment Room	Central	2017-04-374	6	15.07	11:21	13:13	112	1688	5	0.001	SC/GS	Yes	Not Occupied.
5	5242	Lab	Central	2017-04-378	7	14.96	12:25	13:16	111	1661	6	0.002	SC/GS	Yes	Not Occupied.
5	5363	Office	Central	2017-04-379	8	15.04	12:31	14:03	92	1384	3.5	0.001	SC/GS	Yes	Not Occupied.
5	5272	Janitor Room	Central	2017-04-380	9	15.12	12:41	14:07	86	1300	5	0.002	SC/GS	Yes	Not Occupied.
5	5207	Office	Central	2017-04-381	4	14.96	13:38	14:57	79	1182	4.5	0.002	SC/GS	Yes	Occupied.
5	5201K	Hallway	Central	2017-04-382	5	15.04	13:45	15:00	75	1128	7	0.003	SC/GS	Yes	Occupied.
5	5230	Lunch Room	Central	2017-04-383	6	15.07	13:55	15:07	72	1085	4.5	0.002	SC/GS	Yes	Occupied.
5	5324K	Hallway	Central	2017-04-384	7	14.96	14:00	15:10	70	1047	9	0.004	SC/GS	Yes	Occupied
	Exterior Control	NA	South of Medical Sciences Building	2017-04-385	1	15.06	14:48	15:55	67	1009	2	0.001	SC/GS	Yes	Exterior sample for comparison.
	Exterior Control	NA	North of Medical Sciences Building	2017-04-386	2	15.03	14:53	16:00	67	1007	3	0.001	SC/GS	Yes	Exterior sample for comparison.
6	Field blank	NA	NA	2017-04-387	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-388	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-389	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-390	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.

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2) For each area tested compare the "Results f/cc" column to your area and how it compares to the above noted regulation.



Phase Contrast Microscopy Air Sampling Program, Medical Sciences Building, Floor 7, University of Toronto, April 5, 2017

Floor	Room	Description	Sample Location	Sample Number	Pump Number	Litres Per Minute	Time On	Time Off	Duration	Total Litres	Total Fibres	Results f/cc	Analyst	Within Acceptable Limits	Comments
7	7366B	Office	Central	2017-04-352	1	15.04	10:07	13:34	207	3113	4	0.001	JG/GS	Yes	Not Occupied.
7	7366A	Office	Central	2017-04-353	2	15.03	10:08	13:35	207	3111	3	0.001	JG/GS	Yes	Not Occupied. Door closed.
7	7366	Lab	Central	2017-04-354	3	15.03	10:09	13:33	204	3066	6.5	0.001	JG/GS	Yes	Not Occupied.
	Exterior Control	NA	South of Medical Sciences Building	2017-04-366	8	15.01	15:38	16:48	70	1051	5	0.002	JG/GS	Yes	Exterior sample for comparison.
	Exterior Control	NA	North of Medical Sciences Building	2017-04-367	9	15.1	15:47	16:58	71	1072	7	0.003	JG/GS	Yes	Exterior sample for comparison.
6	Field blank	NA	NA	2017-04-368	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-369	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-370	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-371	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.

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Phase Contrast Microscopy Air Sampling Program, Medical Sciences Building, Floor 6, University of Toronto, April 5, 2017

Floor	Room	Description	Sample Location	Sample Number	Pump Number	Litres Per Minute	Time On	Time Off	Duration	Total Litres	Total Fibres	Results f/cc	Analyst	Within Acceptable Limits	Comments
6	6342	Lab	Central	2017-04-355	4	14.91	10:41	13:44	183	2728	7.5	0.001	JG/GS	Yes	Occupied.
6	6302	Lab	Adjacent to Office.	2017-04-356	5	15.07	11:26	13:40	134	2019	3.5	0.001	JG/GS	Yes	Occupied.
6	6303	Conference Room	Central	2017-04-357	6	15.1	11:39	14:23	164	2476	4.5	0.001	JG/GS	Yes	Not Occupied.
6	6222	Meeting Room	Central	2017-04-360	7	15.05	12:29	14:30	71	1069	11	0.004	JG/GS	Yes	Not Occupied.
6	6206	Lab	Central	2017-04-361	1	15.04	14:47	16:08	81	1218	14	0.005	JG/GS	Yes	Not Occupied.
6	6345B	Student Room	Central	2017-04-362	2	15.03	14:55	16:12	77	1157	9	0.003	JG/GS	Yes	Occupied.
6	6277	Lab	Central	2017-04-363	3	15.03	15:05	16:16	71	1067	12.5	0.005	JG/GS	Yes	Occupied.
6	6356	Lab	Central	2017-04-364	6	15.1	15:25	16:35	70	1057	8	0.003	JG/GS	Yes	Occupied.
6	6352	Lab	Central	2017-04-365	7	15.05	15:32	16:40	68	1023	5	0.002	JG/GS	Yes	Occupied.
	Exterior Control	NA	South of Medical Sciences Building	2017-04-366	8	15.01	15:38	16:48	70	1051	5	0.002	JG/GS	Yes	Exterior sample for comparison.
	Exterior Control	NA	North of Medical Sciences Building	2017-04-367	9	15.1	15:47	16:58	71	1072	7	0.003	JG/GS	Yes	Exterior sample for comparison.
6	Field blank	NA	NA	2017-04-368	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-369	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-370	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-371	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.

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Interpretation of Results

1) Within Ontario, the Occupational Health and Safety Act - Ontario Regulation 490/09 Designated Substances adopts the ACGIH TWA of 0.1 fibres/cc.

2) For each area tested compare the "Results f/cc" column to your area and how it compares to the above noted regulation.

Phase Contrast Microscopy Air Sampling Program, Medical Sciences Building, Floor 7, University of Toronto, April 4, 2017

Floor	Room	Description	Sample Location	Sample Number	Pump Number	Litres Per Minute	Time On	Time Off	Duration	Total Litres	Total Fibres	Results f/cc	Analyst	Within Acceptable Limits	Comments
7	7360	Lab	Central	2017-04-330	1	14.99	11:10	12:48	98	1469	10.5	0.003	SC/GS	Yes	Not Occupied.
7	7352	Lab	Central	2017-04-331	2	14.95	11:18	12:51	93	1390	2	0.001	SC/GS	Yes	Not Occupied.
7	7334	Lab	Central	2017-04-332	3	15.06	11:24	12:54	90	1355	101.5	0.065	SC/GS	Yes	Under Construction. Not Occupied. Above SEL action level. Particulate and dust likely generated from construction related work.
7	7318	Lab	Central	2017-04-335	6	14.96	11:53	13:12	79	1182	3	0.001	SC/GS	Yes	Occupied.
7	7316	Lab	Southeast	2017-04-336	7	15.08	11:58	13:14	76	1146	3	0.001	SC/GS	Yes	Occupied.
7	7310	Lab	Central	2017-04-337	8	15.01	12:03	13:20	77	1156	6.5	0.002	SC/GS	Yes	Occupied.
7	7302	Lab	Central	2017-04-338	9	15.01	12:09	13:24	75	1126	7.5	0.003	SC/GS	Yes	Occupied.
7	7317	Lab	Central	2017-04-339	1	14.99	13:43	15:13	90	1349	2.5	0.001	SC/GS	Yes	Occupied.
7	7331	Glasswashing Room	Central	2017-04-340	2	14.95	13:53	15:17	84	1256	24	0.008	SC/GS	Yes	Occupied.
7	7363	Lab	Central	2017-04-341	3	15.06	14:03	15:20	77	1160	10	0.004	SC/GS	Yes	Occupied.
7	7363A	Office	Central	2017-04-342	4	15.04	14:08	15:24	76	1143	17	0.006	SC/GS	Yes	Occupied.
7	7365	Lab	Central	2017-04-343	5	14.94	14:19	15:30	71	1061	8	0.003	SC/GS	Yes	Not Occupied.
7	7258	Lab	Central	2017-04-344	6	14.96	14:28	15:39	71	1062	7	0.003	SC/GS	Yes	Not Occupied.
7	7268	Lab	Central	2017-04-345	7	15.08	14:33	15:46	73	1101	9	0.004	SC/GS	Yes	Not Occupied.

Phase Contrast Microscopy Air Sampling Program, Medical Sciences Building, Floor 7, University of Toronto, April 4, 2017

Floor	Room	Description	Sample Location	Sample Number	Pump Number	Litres Per Minute	Time On	Time Off	Duration	Total Litres	Total Fibres	Results f/cc	Analyst	Within Acceptable Limits	Comments
	Exterior Control	NA	South of Medical Sciences Building	2017-04-346	8	15.01	14:39	15:55	76	1141	2	0.001	SC/GS	Yes	Exterior sample for comparison.
	Exterior Control	NA	North of Medical Sciences Building	2017-04-347	9	15.01	14:45	15:58	73	1096	3	0.001	SC/GS	Yes	Exterior sample for comparison.
6	Field blank	NA	NA	2017-04-348	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-349	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-350	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-351	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.

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Interpretation of Results

1) Within Ontario, the Occupational Health and Safety Act - Ontario Regulation 490/09 Designated Substances adopts the ACGIH TWA of 0.1 fibres/cc.

2) For each area tested compare the "Results f/cc" column to your area and how it compares to the above noted regulation.



Phase Contrast Microscopy Air Sampling Program, Medical Sciences Building, Floor 3, University of Toronto, April 4, 2017

Floor	Room	Description	Sample Location	Sample Number	Pump Number	Litres Per Minute	Time On	Time Off	Duration	Total Litres	Total Fibres	Results f/cc	Analyst	Within Acceptable Limits	Comments
3	3318	Lab	Central	2017-04-333	4	15.04	11:39	13:01	82	1233	4	0.001	SC/GS	Yes	Not Occupied.
3	3316	Lab	Central	2017-04-334	5	14.94	11:44	13:04	80	1195	3	0.001	SC/GS	Yes	Not Occupied.
	Exterior Control	NA	South of Medical Sciences Building	2017-04-346	8	15.01	14:39	15:55	76	1141	2	0.001	SC/GS	Yes	Exterior sample for comparison.
	Exterior Control	NA	North of Medical Sciences Building	2017-04-347	9	15.01	14:45	15:58	73	1096	3	0.001	SC/GS	Yes	Exterior sample for comparison.
6	Field blank	NA	NA	2017-04-348	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-349	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-350	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-351	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.

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Interpretation of Results

1) Within Ontario, the Occupational Health and Safety Act - Ontario Regulation 490/09 Designated Substances adopts the ACGIH TWA of 0.1 fibres/cc.

2) For each area tested compare the "Results f/cc" column to your area and how it compares to the above noted regulation.

Phase Contrast Microscopy Air Sampling Program, Medical Sciences Building, 7th Floor, University of Toronto, April 3, 2017

Floor	Room	Description	Sample Location	Sample Number	Pump Number	Litres Per Minute	Time On	Time Off	Duration	Total Litres	Total Fibres	Results f/cc	Analyst	Within Acceptable Limits	Comments
7	7366	Lab	Central	2017-04-316	6	14.99	13:27	14:52	85	1274	100	0.076	SC/GS	Yes	Not occupied. 45 fields counted.
7	7366A	Office	Central	2017-04-317	2	15.05	13:30	14:54	84	1264	100.5	0.03	SC/GS	Yes	Not occupied. Door Closed. 70 fields counted.
7	7366B	Office	Central	2017-04-318	3	15.01	13:33	14:55	82	1231	37.5	0.013	SC/GS	Yes	Not Occupied.
NA	NA	Exterior Control	South of Medical Sciences Building	2017-04-324	2	15.05	15:44	17:07	83	1249	3	0.001	SC/GS	Yes	Required as per NIOSH Method 7400.
NA	NA	Exterior Control	North of Medical Sciences Building	2017-04-325	3	15.01	15:49	17:13	84	1261	3	0.001	SC/GS	Yes	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-326	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-327	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-328	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-329	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.

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Interpretation of Results

- 1) Within Ontario, the Occupational Health and Safety Act - Ontario Regulation 490/09 Designated Substances adopts the ACGIH TWA of 0.1 fibres/cc.
- 2) For each area tested compare the "Results f/cc" column to your area and how it compares to the above noted regulation.

Phase Contrast Microscopy Air Sampling Program, Medical Sciences Building, 4th Floor, University of Toronto, April 3, 2017

Floor	Room	Description	Sample Location	Sample Number	Pump Number	Litres Per Minute	Time On	Time Off	Duration	Total Litres	Total Fibres	Results f/cc	Analyst	Within Acceptable Limits	Comments
4	4185S	Stairwell	Landing	2017-04-319	8	15.13	14:28	15:57	89	1347	7	0.002	SC/GS	Yes	Occupied.
4	4388S	Stairwell	Landing	2017-04-322	9	15.03	16:14	17:25	71	1067	6	0.002	SC/GS	Yes	Occupied.
4	4298S	Stairwell	Landing	2017-04-323	8	15.13	16:22	17:39	77	1165	2.5	0.001	SC/GS	Yes	Occupied.
NA	NA	Exterior Control	South of Medical Sciences Building	2017-04-324	2	15.05	15:44	17:07	83	1249	3	0.001	SC/GS	Yes	Required as per NIOSH Method 7400.
NA	NA	Exterior Control	North of Medical Sciences Building	2017-04-325	3	15.01	15:49	17:13	84	1261	3	0.001	SC/GS	Yes	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-326	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-327	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-328	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-329	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.

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Interpretation of Results

- 1) Within Ontario, the Occupational Health and Safety Act - Ontario Regulation 490/09 Designated Substances adopts the ACGIH TWA of 0.1 fibres/cc.
- 2) For each area tested compare the "Results f/cc" column to your area and how it compares to the above noted regulation.

Phase Contrast Microscopy Air Sampling Program, Medical Sciences Building, 3rd Floor, University of Toronto, April 3, 2017

Floor	Room	Description	Sample Location	Sample Number	Pump Number	Litres Per Minute	Time On	Time Off	Duration	Total Litres	Total Fibres	Results f/cc	Analyst	Within Acceptable Limits	Comments
3	3336A	Office	Central	2017-04-311	2	15.05	11:09	12:57	108	1625	2	0.001	SC/GS	Yes	Occupied.
3	3275	Cold Room	Central	2017-04-312	3	15.01	11:17	13:02	105	1576	2.5	0.001	SC/GS	Yes	Not Occupied.
3	3342B	Office	Central	2017-04-314	5	15.06	12:10	13:46	96	1446	6	0.002	SC/GS	Yes	Occupied.
3	3175S	Stairwell	Landing	2017-04-315	8	15.13	12:45	14:11	86	1301	6.5	0.002	SC/GS	Yes	Occupied.
3	3298S	Stairwell	Landing	2017-04-320	9	15.03	14:42	16:05	83	1247	6.5	0.002	SC/GS	Yes	Occupied.
3	3388S	Stairwell	Landing	2017-04-321	6	14.99	15:22	17:00	98	1469	4.5	0.001	SC/GS	Yes	Occupied.
NA	NA	Exterior Control	South of Medical Sciences Building	2017-04-324	2	15.05	15:44	17:07	83	1249	3	0.001	SC/GS	Yes	Required as per NIOSH Method 7400.
NA	NA	Exterior Control	North of Medical Sciences Building	2017-04-325	3	15.01	15:49	17:13	84	1261	3	0.001	SC/GS	Yes	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-326	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-327	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-328	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-329	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.

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Interpretation of Results

1) Within Ontario, the Occupational Health and Safety Act - Ontario Regulation 490/09 Designated Substances adopts the ACGIH TWA of 0.1 fibres/cc.

2) For each area tested compare the "Results f/cc" column to your area and how it compares to the above noted regulation.

Phase Contrast Microscopy Air Sampling Program, Medical Sciences Building, 1st Floor, University of Toronto, April 3, 2017

Floor	Room	Description	Sample Location	Sample Number	Pump Number	Litres Per Minute	Time On	Time Off	Duration	Total Litres	Total Fibres	Results f/cc	Analyst	Within Acceptable Limits	Comments
1	1209	Services	Central	2017-04-313	4	14.99	11:44	13:34	110	1649	3	0.001	SC/GS	Yes	Not occupied.
NA	NA	Exterior Control	South of Medical Sciences Building	2017-04-324	2	15.05	15:44	17:07	83	1249	3	0.001	SC/GS	Yes	Required as per NIOSH Method 7400.
NA	NA	Exterior Control	North of Medical Sciences Building	2017-04-325	3	15.01	15:49	17:13	84	1261	3	0.001	SC/GS	Yes	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-326	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-327	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-328	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-329	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.

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Interpretation of Results

- 1) Within Ontario, the Occupational Health and Safety Act - Ontario Regulation 490/09 Designated Substances adopts the ACGIH TWA of 0.1 fibres/cc.
- 2) For each area tested compare the "Results f/cc" column to your area and how it compares to the above noted regulation.



Appendix B

LOCATION SPECIFIC TECHNICAL REPORTS

April 2nd, 2017

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

Attn: Mr. Irfan Miraj, P.Eng, MHSc.
Coordinator, Hazardous Construction Materials Group

Re: Air Monitoring Report – April 2nd, 2017
University of Toronto – Medical Sciences Building, Room 7368
1 King's College Circle, Toronto, Ontario

1.0 BACKGROUND

On April 2nd, 2017, Safetech Environmental Limited (SEL) was contacted to provide air monitoring services within Room 7368, 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 potentially migrated into Room 7368 during and following renovation activities. Concerns were raised by user groups regarding the potential for elevated levels of dust. As such, three air samples were collected within the aforementioned affected area and adjacent offices

2.0 METHODOLOGY

2.1 Air Monitoring for Airborne Fibres

Three (3) phase contrast microscopy (PCM) air sample were retrieved within each area. 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 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 April 2nd, 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
April 2nd, 2017

Sample No.	Sample Location	Start Time	Stop Time	Sample Volume (L)	Airborne Fibre Conc. (f/cc)
2017-04-303	Office (7368A)	14:12	15:43	1365	0.002
2017-04-304	Office (7368B)	14:13	15:42	1335	0.002
2017-04-305	Laboratory (7368)	14:14	15:44	1350	0.002

4.0 CONCLUSIONS

Results of air monitoring on April 2nd, 2017 indicated that at the time of sampling, the airborne fibre concentration within Laboratory 7368 and adjacent Offices 7368A/B of the Medical Sciences Building were 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 locations 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



Glenn Smith, BA, CRSP, AMRT
Senior Project Manager



April 2nd, 2017

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

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

Re: Air Monitoring Report – April 2nd, 2017
University of Toronto – Medical Sciences Building, Room 7366
1 King's College Circle, Toronto, Ontario

1.0 BACKGROUND

On March 2nd, 2017, Safetech Environmental Limited (SEL) was contacted to provide a visual inspection and air monitoring services within Room 7366 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 and Dr. Richard Hegele, Vice-Dean, Research and Innovation, Faculty of Medicine for the University of Toronto.

Asbestos containing dust had reportedly been found within Room 7366 and adjacent Offices 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 areas on April 2nd, 2017 following the completion of cleanup activities.

Upon completion of removal and final cleaning procedures, a post-abatement visual inspection was conducted in the presence of Dr. Richard Hagle. 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

Three phase contrast microscopy (PCM) air samples were retrieved within the Offices 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 April 2nd, 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
April 2nd, 2017

Sample No.	Sample Location	Start Time	Stop Time	Sample Volume (L)	Airborne Fibre Conc. (f/cc)
2017-04-308	Laboratory (7366)	17:19	18:31	1080	0.002
2017-04-309	Office (7366A)	17:21	18:33	1080	0.004
2017-04-310	Lab (7366B)	17:25	18:35	1050	0.004

4.0 CONCLUSIONS

Results of our post-abatement visual inspection verified that all dust had been removed from within Laboratory 7366 and adjacent Offices 7366A and 7366B. In addition, no

visible dust or debris associated with the area was observed within the designated work area. Results of air monitoring on April 2nd, 2017 indicated that at the time of sampling, the airborne fibre concentration within Laboratory 7366 and adjacent Offices 7366A and 7366B of the Medical Sciences Building were 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 locations 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,

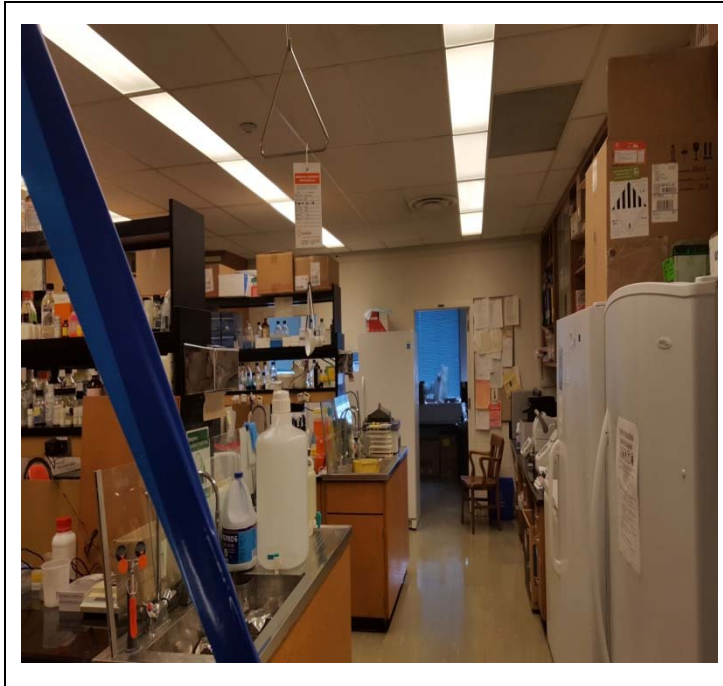
SAFETECH ENVIRONMENTAL LIMITED



Josh Hamilton
OH&S Technician

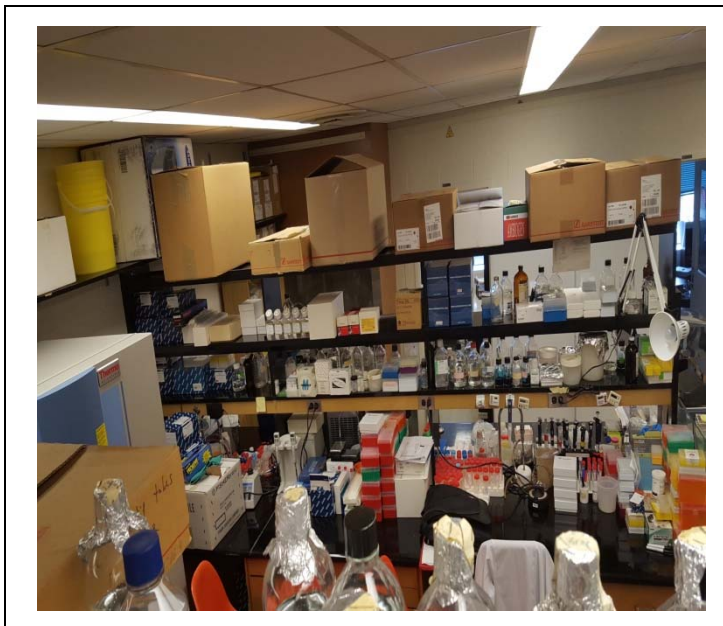


Glenn Smith, BA, CRSP, AMRT
Senior Project Manager



P1 – 7366

All surfaces were free from dust and debris.



P1 – 7366

All lab tools and equipment were individually cleaned.



P3 – 7366

View below equipment in question following cleaning.



P4 – 7366A

View of counter beneath equipment where dust was formerly found.

April 2nd, 2017

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

Attn: Mr. Irfan Miraj, P.Eng, MHSc.
Coordinator, Hazardous Construction Materials Group

Re: Air Monitoring Report – April 2nd, 2017
University of Toronto – Medical Sciences Building, Room 6360
1 King's College Circle, Toronto, Ontario

1.0 BACKGROUND

On April 2nd, 2017, Safetech Environmental Limited (SEL) was contacted to provide air monitoring services within Room 6360, 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 potentially migrated into Room 6360 during and following renovation activities. Concerns were raised by user groups regarding the potential for elevated levels of dust. As such, two air samples were collected within the aforementioned affected area and adjacent office

2.0 METHODOLOGY

2.1 Air Monitoring for Airborne Fibres

Two (2) phase contrast microscopy (PCM) air samples were retrieved within the area. 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 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 April 2nd, 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
April 2nd, 2017

Sample No.	Sample Location	Start Time	Stop Time	Sample Volume (L)	Airborne Fibre Conc. (f/cc)
2017-04-301	Office (6360B)	13:40	15:00	1200	0.003
2017-04-302	Laboratory (6360)	13:43	14:58	1125	0.002

4.0 CONCLUSIONS

Results of air monitoring on April 2nd, 2017 indicated that at the time of sampling, the airborne fibre concentration within Laboratory 6360 and adjacent Office (6360B) of the Medical Sciences Building were 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 locations 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



Glenn Smith, BA, CRSP, AMRT
Senior Project Manager

April 2nd, 2017

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

Attn: Mr. Irfan Miraj, P.Eng, MHSc.
Coordinator, Hazardous Construction Materials Group

Re: Air Monitoring Report – April 2nd, 2017
University of Toronto – Medical Sciences Building, Room 6334C/6334
1 King's College Circle, Toronto, Ontario

1.0 BACKGROUND

On April 2nd, 2017, Safetech Environmental Limited (SEL) was contacted to provide air monitoring services within 6334C, the shaft adjacent to 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 Shaft (6334C) during renovation activities. Concerns were raised by user groups regarding the potential for elevated levels of dust. As such, an air sample was collected within the aforementioned affected area (6334C) and Room 6334 as a precautionary measure.

2.0 METHODOLOGY

2.1 Air Monitoring for Airborne Fibres

One phase contrast microscopy (PCM) air sample was retrieved within each area. The air samples 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 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 pump was calibrated to a flow rate of 15 litres per minute. The air sample was collected using 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 April 2nd, 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, 2017

Sample No.	Sample Location	Start Time	Stop Time	Sample Volume (L)	Airborne Fibre Conc. (f/cc)
2017-04-306	Shaft (6334C)	16:40	17:57	1155	0.002
2017-04-307	Laboratory (6334)	16:45	17:55	1050	0.003

4.0 CONCLUSIONS

Results of air monitoring on April 2nd, 2017 indicated that at the time of sampling, the airborne fibre concentration within Room 6334C and Laboratory 6334 of the Medical Sciences Building were 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 locations 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

Appendix C

TEM LABORATORY CERTIFICATE OF ANALYSIS



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 Or 551703468
CustomerID: 55SELI62
CustomerPO: 119917
ProjectID:

Attn: **Glenn Smith**
Safetech Environmental
3045 Southcreek Road
Unit 14
Mississauga, ON L4X 2X7

Phone: (905) 624-2722
Fax: (905) 624-4306
Received: 04/04/17 5:36 PM
Analysis Date: 4/5/2017
Collected: 4/3/2017

Project: **MEDICAL SCIENCES BUILDING- 119917**

**Test Report: Asbestos Analysis of Air Samples by Transmission Electron Microscopy
via NIOSH Method 7402**

Sample	Volume (Liters)	Non Asbestos Fibers	PCM F/cc	Asbestos Type(s)	Asbestos Fibers	Asbestos % of total	7402 Adjusted (TEM) F/cc	Notes
2017-04-316 ROOM #7366 551703468-0001	1274	13.5	0.076				<0.0021	Customer Set 1 PCM Data From Client
2017-04-328 551703468-0002	0	0.0					N/A	Field Blank 1
2017-04-329 551703468-0003	0	0.0					N/A	Field Blank 1

NIOSH 7402 method only reports fibers > 5µm in length and > 0.25µm in width.
This method requires a minimum of 2 field blank analyses per set. The results above are blank corrected when possible.
Average number of asbestos fibers on field blanks: 0
Average number of non-asbestos fibers on field blanks: 0

Analyst(s)
Natalie D'Amico (3)

Matthew Davis
or other approved signatory

EMSL is not responsible for data reported in fibers/cc, which is dependent on volume collected by non-laboratory personnel. The above report relates only to the items tested. This report may not be reproduced, except in full, without written approval by EMSL Analytical, Inc. Samples received in good condition unless otherwise noted.
Samples analyzed by EMSL Canada Inc. Mississauga, ON

Initial report from 04/05/2017 14:39:23



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 Or 551703421
CustomerID: 55SELI62
CustomerPO: 119917
ProjectID:

Attn: **Glenn Smith**
Safetech Environmental
3045 Southcreek Road
Unit 14
Mississauga, ON L4X 2X7
Project: **Medical Sciences Building - 119917**

Phone: (905) 624-2722
Fax: (905) 624-4306
Received: 04/03/17 4:15 PM
Analysis Date: 4/4/2017
Collected:

Test Report: Asbestos Analysis of Air Samples by Transmission Electron Microscopy via NIOSH Method 7402

Sample	Volume (Liters)	Non Asbestos Fibers	PCM F/cc	Asbestos Type(s)	Asbestos Fibers	Asbestos % of total	7402 Adjusted (TEM) F/cc	Notes
2017-03-216 Room 7366A 551703421-0001	1208	0.0	0.030				<0.0022	Customer Set 1 PCM Data From Client
2017-03-217 Room 7366B 551703421-0002	1220	0.0	0.017	Chrysotile	1		0.0170	Customer Set 1 PCM Data From Client
2017-03-218 Room 7368 551703421-0003	1320	2.5	0.020				<0.0020	Customer Set 1 PCM Data From Client
Blank 551703421-0004	0	0.0					N/A	Field Blank 1
Blank 551703421-0005	0	0.0					N/A	Field Blank 1

NIOSH 7402 method only reports fibers > 5µm in length and > 0.25µm in width. This method requires a minimum of 2 field blank analyses per set. The results above are blank corrected when possible. Average number of asbestos fibers on field blanks: 0
Average number of non-asbestos fibers on field blanks: 0

Analyst(s)
Natalie D'Amico (5)

Matthew Davis
or other approved signatory

EMSL is not responsible for data reported in fibers/cc, which is dependent on volume collected by non-laboratory personnel. The above report relates only to the items tested. This report may not be reproduced, except in full, without written approval by EMSL Analytical, Inc. Samples received in good condition unless otherwise noted.
Samples analyzed by EMSL Canada Inc. Mississauga, ON

Report Amended: 04/04/2017 17:43:12 Replaces Report Amended: 04/04/2017 16:20:12. Reason Code: Data Entry-Change to Location

**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 Or 551703557

CustomerID: 55SELI62

CustomerPO: 119917

ProjectID:

Attn: **Glenn Smith**
Safetech Environmental
3045 Southcreek Road
Unit 14
Mississauga, ON L4X 2X7

Phone: (905) 624-2722
 Fax: (905) 624-4306
 Received: 04/06/17 10:11 AM
 Analysis Date: 4/6/2017
 Collected: 4/3/2017

Project: **Medical Sciences Building - 119917**

Test Report: Asbestos Analysis of Air Samples by Transmission Electron Microscopy via NIOSH Method 7402

Sample	Volume (Liters)	Non Asbestos Fibers	PCM F/cc	Asbestos Type(s)	Asbestos Fibers	Asbestos % of total	7402 Adjusted (TEM) F/cc	Notes
2017-04-317- Room #7366A 551703557-0001	1264	4	0.030			0	<0.002	Customer Set 1 PCM Data From Client
2017-04-318- Room #7366B 551703557-0002	1231	1.5	0.013			0	<0.002	Customer Set 1 PCM Data From Client
2017-04-326 551703557-0003	0	0	n/a			0	n/a	Field Blank 1
2017-04-327 551703557-0004	0	0	n/a			0	n/a	Field Blank 1

NIOSH 7402 method only reports fibers > 5µm in length and > 0.25µm in width.

This method requires a minimum of 2 field blank analyses per set. The results above are blank corrected when possible.

Average number of asbestos fibers on field blanks: 0

Average number of non-asbestos fibers on field blanks: 0

Analyst(s)

Jon Delos Santos (4)

Matthew Davis
 or other approved signatory

EMSL is not responsible for data reported in fibers/cc, which is dependent on volume collected by non-laboratory personnel. The above report relates only to the items tested. This report may not be reproduced, except in full, without written approval by EMSL Analytical, Inc. Samples received in good condition unless otherwise noted.

Samples analyzed by EMSL Canada Inc. Mississauga, ON

Report Amended: 04/06/2017 20:52:43 Replaces Report Amended: 04/06/2017 20:25:19. Reason Code: Data Entry-Change to Sample ID

Appendix D

PUMP CALIBRATION SHEETS



Pump Calibration Form

Calibration Device: BIOS DryCal DC Lite HV

Date: April 5, 2017

Name: Josh Hamilton

Temperature: 22°C

Barometric Pressure: 101.6 kPa

Pump Number	Flow Rate (L/min)			Average Flow Rate (L/min)	Average Flow Rate (L/min) +10%	Average Flow Rate (L/min) -10%
	Trial #1	Trial #2	Trial #3			
MSB -1	15.03	15.04	15.04	15.04	16.54	13.54
MSB-2	15.03	15.03	15.03	15.03	16.53	13.53
MSB -3	15.04	15.03	15.03	15.03	16.53	13.53
MSB -4	14.92	14.91	14.91	14.91	16.41	13.41
MSB-5	15.12	15.01	15.07	15.07	16.57	13.57
MSB -6	15.08	15.11	15.12	15.10	16.60	13.60
MSB -7	15.04	15.05	15.05	15.05	16.55	13.55
MSB-8	14.98	15.04	15.02	15.01	16.51	13.51
MSB -9	15.10	15.08	15.11	15.10	16.60	13.60
MSB -10						



Pump Calibration Form

Calibration Device: BIOS DryCal DC Lite HV

Date: April 6, 2017

Name: Josh Hamilton

Temperature: 22°C

Barometric Pressure: 101.9 kPa

Pump Number	Flow Rate (L/min)			Average Flow Rate (L/min)	Average Flow Rate (L/min) +10%	Average Flow Rate (L/min) -10%
	Trial #1	Trial #2	Trial #3			
MSB -1	15.10	15.04	15.02	15.06	16.56	13.56
MSB-2	15.02	15.03	15.03	15.03	16.53	13.53
MSB -3	15.04	14.98	15.00	15.01	16.51	13.51
MSB -4	14.90	14.99	14.98	14.96	16.46	13.46
MSB-5	15.10	15.01	15.01	15.04	16.54	13.54
MSB -6	15.12	15.10	15.07	15.07	16.57	13.57
MSB -7	14.88	15.01	14.99	14.96	16.56	13.56
MSB-8	14.99	15.07	15.05	15.04	16.54	13.54
MSB -9	15.20	15.16	15.01	15.12	16.62	13.62
MSB -10						



Pump Calibration Form

Calibration Device: BIOS DryCal DC Lite HV

Date: April 7, 2017

Name: Josh Hamilton

Temperature: 22°C

Barometric Pressure: 102.1 kPa

Pump Number	Flow Rate (L/min)			Average Flow Rate (L/min)	Average Flow Rate (L/min) +10%	Average Flow Rate (L/min) -10%
	Trial #1	Trial #2	Trial #3			
MSB-1	15.00	15.01	15.01	15.01	16.51	13.51
MSB-2	15.08	15.03	15.01	15.04	16.54	13.54
MSB-3	14.99	15.02	15.01	15.01	16.51	13.51
MSB-4	15.12	15.04	15.02	15.06	16.56	13.56
MSB-5	15.02	15.04	15.00	15.02	16.52	13.52
MSB-6	14.88	14.90	14.95	14.91	16.41	13.41
MSB-7	15.07	15.02	15.00	15.03	16.53	13.53
MSB-8	14.81	14.98	15.01	14.93	16.43	13.43
MSB-9	15.07	15.03	15.03	15.04	16.54	13.54
MSB-10						



Pump Calibration Form

Calibration Device: BIOS DryCal DC Lite HV

Date: April 4, 2017

Name: April 4, 2017

Temperature: 22°C

Barometric Pressure: 99.4 kPa

Pump Number	Flow Rate (L/min)			Average Flow Rate (L/min)	Average Flow Rate (L/min) +10%	Average Flow Rate (L/min) -10%
	Trial #1	Trial #2	Trial #3			
MSB -1	14.99	14.99	14.99	14.99	16.49	13.49
MSB-2	14.95	14.95	14.95	14.95	16.45	13.45
MSB-3	15.07	15.05	15.05	15.06	16.56	13.56
MSB-4	15.03	15.07	15.01	15.04	16.54	13.54
MSB-5	14.99	14.92	14.91	14.94	16.44	13.44
MSB-6	14.96	14.96	14.96	14.96	16.46	13.46
MSB-7	15.07	15.08	15.08	15.08	16.58	13.58
MSB-8	15.01	15.01	15.00	15.01	16.51	13.51
MSB-9	15.01	15.00	15.01	15.01	16.51	13.51
MSB -10						



Pump Calibration Form

Calibration Device: BIOS DryCal DC Lite HV

Date: April 3, 2017

Name: Josh Hamilton

Temperature: 22°C

Barometric Pressure: 101.7 kPa

Pump Number	Flow Rate (L/min)			Average Flow Rate (L/min)	Average Flow Rate (L/min) +10%	Average Flow Rate (L/min) -10%
	Trial #1	Trial #2	Trial #3			
MSB-1	15.04	15.04	15.04	15.04	16.54	13.54
MSB-2	15.04	15.05	15.05	15.05	16.55	13.55
MSB-3	15.01	15.00	15.01	15.01	16.51	13.51
MSB-4	14.99	15.04	14.95	14.99	16.49	13.49
MSB-5	15.03	15.07	15.08	15.06	16.56	13.56
MSB-6	14.99	14.99	14.99	14.99	16.49	13.49
MSB-7	15.08	15.08	15.08	15.08	16.58	13.58
MSB-8	15.12	15.12	15.14	15.13	16.63	13.63
MSB-9	15.03	15.04	15.01	15.02	16.53	13.53
MSB-10						

Appendix E

PCM ANALYSIS EXAMPLE CALCULATION SHEET



PCM Air Sample Analysis

Project Name:	UofT Medical Sciences Building		
Project Number:	119917		
Sample ID:	2017-04-347	Sample Type:	Ambient
Sample Collected By:	JH	Date:	April 4 2017
Sample Analyzed By:	SC/GS	Date:	April 4 2017
Sample Location:	Exterior MSB North Side		
Start Time:	14:45	Sample Duration (min)	73
Finish Time:	15:58	Flow Rate (L/min)	1501

Volume (V)	1096	L
Total Fibres Counted in Sample (FCS)	3	fibres
Total Fields Counted in Sample (FLS)	100	fields
Reticle Field Area (RFA)	0.00801	mm ²
Area of Filter (AF)	385	mm ²
NIOSH 7400 Counting Rules Used	A	
Fibre Density (E)	3.7 0.001	fibres/mm ²
Fibre Concentration (C)	0.001	fibres/cc
		$E = (FCS/FLS)/RFA$
		$C = (E*385)/(V*1000)$

1	✓	11	✓	21	✓	31	✓	41	✓	51	✓	61	✓	71	✓	81	✓	91	✓
2	✓	12	✓	22	✓	32	✓	42	✓	52	✓	62	✓	72	✓	82	✓	92	✓
3	✓	13	✓	23	✓	33	✓	43	✓	53	✓	63	✓	73	✓	83	✓	93	✓
4	✓	14	✓	24	✓	34	✓	44	✓	54	✓	64	✓	74	✓	84	✓	94	✓
5	✓	15	✓	25	✓	35	✓	45	✓	55	✓	65	✓	75	✓	85	✓	95	✓
6	✓	16	✓	26	✓	36	✓	46	✓	56	✓	66	✓	76	✓	86	✓	96	✓
7	✓	17	✓	27	✓	37	✓	47	✓	57	✓	67	✓	77	✓	87	✓	97	✓
8	✓	18	✓	28	✓	38	✓	48	✓	58	✓	68	✓	78	✓	88	✓	98	✓
	✓	19	✓	29	✓	39	✓	49	✓	59	✓	69	✓	79	✓	89	✓	99	✓
10	✓	20	✓	30	✓	40	✓	50	✓	60	✓	70	✓	80	✓	90	✓	100	✓