

April 26, 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 17-22, 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 17 to April 22, 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 detail of air sampling conducted from April 17-22, 2017. Please be advised no air samples were collected on April 19 and 21, 2017.

From April 17 to April 22, SEL has collected a total of 65 representative samples, 0 location specific samples and 8 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 65 representative samples; all 65 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.
- All 8 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 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 – Pump Calibration Sheets
- Appendix C – PCM Analysis Example Calculation Sheet

Appendix A

PCM AIR SAMPLE SPREADSHEET-SEL

Phase Contrast Microscopy Air Sampling Program, Medical Sciences Building, Floor 3, University of Toronto, April 22, 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	3302A	Shaft	Central	2017-04-662	14	14.97	9:00	10:15	75	1123	2.5	0.001	SC/GS	Yes	
3	3302	Lab	Central	2017-04-663	12	15	9:00	10:15	75	1125	3.5	0.001	SC/GS	Yes	
3	3312	Shaft	Central	2017-04-664	5	14.99	9:05	10:20	75	1124	7	0.003	SC/GS	Yes	
3	3311	Corridor	Central	2017-04-665	1	14.97	9:08	10:20	74	1108	2	0.001	SC/GS	Yes	
3	3320	Shaft	Central	2017-04-666	9	14.97	9:15	10:26	71	1063	3	0.001	SC/GS	Yes	Floor plan indicated 3822 but shaft number is 3320
3	3318	Corridor	Central	2017-04-667	7	15.03	9:16	10:26	70	1052	3	0.001	SC/GS	Yes	
3	Outside 3321	Corridor	Central	2017-04-668	3	14.99	9:19	10:30	71	1064	6	0.002	SC/GS	Yes	
3	3323	Shaft	Central	2017-04-669	4	15	9:20	10:30	70	1050	2.5	0.001	SC/GS	Yes	
3	3232A	Shaft	Central	2017-04-670	10	15	9:23	10:36	73	1095	5	0.002	SC/GS	Yes	
3	3232	Lab	Central	2017-04-671	8	14.99	9:25	10:36	71	1064	3	0.001	SC/GS	Yes	
3	3340	Shaft	Central	2017-04-672	2	15.04	9:29	10:42	73	1098	4.5	0.002	SC/GS	Yes	
3	3341	Corridor	Central	2017-04-673	6	14.98	9:30	10:42	72	1079	10	0.004	SC/GS	Yes	
3	3348	Shaft	Central	2017-04-674	2	15.04	10:48	12:00	72	1083	4	0.002	SC/GS	Yes	
3	3345	Corridor	Central	2017-04-675	6	14.98	10:49	12:00	71	1064	6	0.02	SC/GS	Yes	
3	3358D	Shaft	Central	2017-04-676	4	15	10:56	12:11	75	1125	3.5	0.001	SC/GS	Yes	
3	3358	Lab	Central	2017-04-677	3	14.99	10:57	12:11	74	1109	3.5	0.001	SC/GS	Yes	
3	3364	Shaft	Central	2017-04-678	7	15.03	11:02	12:16	74	1112	8	0.003	SC/GS	Yes	
3	3366	Lab	Central	2017-04-679	9	14.97	11:02	12:16	74	1108	6.5	0.003	SC/GS	Yes	

Phase Contrast Microscopy Air Sampling Program, Medical Sciences Building, Floor 3, University of Toronto, April 22, 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	3372	Shaft	Central	2017-04-680	1	14.97	11:10	12:21	71	1063	6	0.002	SC/GS	Yes	
3	3371	Corridor	Central	2017-04-681	5	14.99	11:11	12:21	70	1049	5.5	0.002	SC/GS	Yes	
3	3359A	Shaft	Central	2017-04-682	14	14.97	11:14	12:26	72	1078	5	0.002	SC/GS	Yes	
3	3359	Lab	Central	2017-04-683	12	15	11:14	12:26	72	1080	4.5	0.002	SC/GS	Yes	
Exterior Sample	South Side	South Side	South Side	2017-04-684	10	15	11:20	11:41	79	1185	2.5	0.001	SC/GS	Yes	Exterior sample for comparison.
Exterior Sample	North Side	North Side	North Side	2017-04-685	8	14.99	11:28	11:48	80	1199	2	0.001	N/A	N/A	Exterior sample for comparison.
Field Blank	N/A	N/A	N/A	2017-04-686	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Required as per NIOSH Method 7400.
Field Blank	N/A	N/A	N/A	2017-04-687	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Required as per NIOSH Method 7400.
Field Blank	N/A	N/A	N/A	2017-04-688	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Required as per NIOSH Method 7400.
Field Blank	N/A	N/A	N/A	2017-04-689	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	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 20, 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	7264	Office	Central	2017-04-638	1	15.02	10:34	11:49	85	1277	2	0.001	JC/GS	Yes	Not Occupied.
7	7258	Lab	Central	2017-04-639	5	15.01	10:39	11:51	72	1081	5	0.002	JC/GS	Yes	Not Occupied.
7	7259	Instrumental Room	Central	2017-04-640	2	14.97	10:45	11:55	70	1048	3	0.001	JC/GS	Yes	Not Occupied.
7	7256	Lab	Central	2017-04-641	6	15.04	10:51	12:29	98	1474	6.5	0.002	JC/GS	Yes	Occupied.
7	7367	Cold Room	Central	2017-04-642	10	15.02	10:56	13:05	129	1938	6	0.001	JC/GS	Yes	Not Occupied.
7	7365	Tissue Culture	Central	2017-04-643	8	15.03	11:00	13:07	127	1909	4.5	0.001	JC/GS	Yes	Not Occupied.
7	7363	Lab	Central	2017-04-644	9	15.07	11:06	13:10	124	1869	2.5	0.001	JC/GS	Yes	Not Occupied.
7	7363B	Lab	Central	2017-04-645	7	15.01	11:10	13:12	122	1831	9	0.002	JC/GS	Yes	Not Occupied.
7	7353	Cold Room	Central	2017-04-646	3	14.98	11:20	13:18	118	1768	9	0.002	JC/GS	Yes	Not Occupied.
7	7344	Lab	Central	2017-04-647	4	15.05	11:25	13:21	116	1746	7.5	0.002	JC/GS	Yes	Occupied.
7	7255	Instrumental Room	Central	2017-04-648	1	15.02	12:44	14:44	120	1802	2	0.001	JC/GS	Yes	Not Occupied.
7	7244	Lab	Central	2017-04-649	5	15.01	12:49	14:47	118	1771	6.5	0.002	JC/GS	Yes	Not Occupied.
7	7238	Lab	Central	2017-04-650	2	14.97	12:53	14:51	118	1766	3	0.001	JC/GS	Yes	Occupied.
7	7234	Elevator Lobby	Central	2017-04-651	10	15.02	13:31	14:54	83	1247	5.5	0.002	JC/GS	Yes	Occupied.
7	7231	Conference Room	Central	2017-04-652	8	15.03	13:42	14:55	73	1097	5	0.002	JC/GS	Yes	Not Occupied.
7	7216	Lab	Central	2017-04-653	9	15.07	13:51	15:42	111	1673	4	0.001	JC/GS	Yes	Not Occupied.

Phase Contrast Microscopy Air Sampling Program, Medical Sciences Building, Floor 7, University of Toronto, April 20, 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	7213	Office	Central	2017-04-654	7	15.01	13:56	15:45	109	1636	4.5	0.001	JC/GS	Yes	Not Occupied.
7	7223	Janitor's Closet	Central	2017-04-655	6	15.04	14:03	15:49	106	1594	3	0.001	JC/GS	Yes	Not Occupied.
	Exterior Control	NA	South of Medical Sciences Building	2017-04-656	3	14.98	14:26	16:04	98	1468	3	0.001	JC/GS	Yes	Exterior sample for comparison.
	Exterior Control	NA	North of Medical Sciences Building	2017-04-657	4	15.05	14:31	16:00	89	1339	6	0.002	JC/GS	Yes	Exterior sample for comparison.
6	Field blank	NA	NA	2017-04-658	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-659	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-660	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-661	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 18, 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	3214	Lab	Central	2017-04-616	3	14.99	9:07	10:58	109	1634	4	0.001	JC/GS	Yes	Occupied.
3	3222	Lab	Central	2017-04-617	4	14.98	9:13	11:05	112	1678	3	0.001	JC/GS	Yes	Not Occupied.
3	3240	Lab	Central	2017-04-618	6	14.99	9:19	11:12	113	1694	4	0.001	JC/GS	Yes	Not Occupied.
3	3256	Lab	Central	2017-04-619	1	14.99	9:28	11:14	106	1589	6	0.002	JC/GS	Yes	Not Occupied.
3	3260	Lab	Central	2017-04-620	2	15.06	9:32	11:16	104	1566	3.5	0.001	JC/GS	Yes	Not Occupied.
3	3264	Study Room	Central	2017-04-621	8	14.95	9:39	11:25	106	1585	4	0.001	JC/GS	Yes	Not Occupied.
3	3352	Lab	Central	2017-04-622	7	15	10:08	11:28	80	1200	6.5	0.002	JC/GS	Yes	Not Occupied.
3	3363	Lab	Central	2017-04-623	10	15.05	10:13	11:34	81	1219	1.5	0.001	JC/GS	Yes	Not Occupied.
3	3247	Lab	Central	2017-04-624	8	14.95	11:57	13:52	115	1719	2.5	0.001	JC/GS	Yes	Not Occupied.
3	3245	Lab	Central	2017-04-625	10	15.05	12:01	13:55	114	1716	5	0.001	JC/GS	Yes	Not Occupied.
3	3261	Lab	Central	2017-04-626	9	14.98	12:13	13:57	104	1558	8	0.002	JC/GS	Yes	Occupied.
3	3265	Freezers	Central	2017-04-627	2	15.06	12:24	14:01	97	1461	4.5	0.001	JC/GS	Yes	Not Occupied.
3	3249K	Hallway	Central	2017-04-628	6	14.99	12:29	14:03	94	1409	7.5	0.002	JC/GS	Yes	Occupied.
3	3209	Office	Central	2017-04-629	7	15	12:38	13:48	70	1050	6.5	0.003	JC/GS	Yes	Occupied.
3	3278	Lecture Hall	Central	2017-04-630	1	14.99	12:51	14:09	78	1169	3.5	0.001	JC/GS	Yes	Not Occupied.
3	3374K	Hallway	Central	2017-04-631	5	15.05	12:55	14:12	77	1159	12	0.005	JC/GS	Yes	Occupied.
	Exterior Control	NA	North of Medical Sciences Building	2017-04-632	3	15.01	13:37	14:47	70	1051	5	0.002	JC/GS	Yes	Exterior sample for comparison.
	Exterior Control	NA	South of Medical Sciences Building	2017-04-633	4	14.98	13:43	14:52	69	1034	6	0.003	JC/GS	Yes	Exterior sample for comparison.
6	Field blank	NA	NA	2017-04-634	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-635	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-636	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-637	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 17, 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	3101K	Hallway	Central	2017-04-606	2	14.98	10:34	11:44	70	1049	4	0.002	JC/GS	Yes	Not Occupied.
3	3117K	Hallway	Central	2017-04-607	9	14.95	10:38	11:46	68	1017	2	0.001	JC/GS	Yes	Not Occupied.
3	3101	Seating Area	North	2017-04-608	10	15.12	10:42	11:50	68	1028	7.5	0.003	JC/GS	Yes	Not Occupied.
3	3101	Seating Area	South	2017-04-609	7	15.04	10:51	11:59	68	1023	3	0.001	JC/GS	Yes	Not Occupied.
	Exterior Control	NA	North of Medical Sciences Building	2017-04-610	5	15.04	14:40	15:50	70	1053	4	0.002	JC/GS	Yes	Exterior sample for comparison.
	Exterior Control	NA	South of Medical Sciences Building	2017-04-611	6	14.94	14:46	15:57	71	1061	3	0.001	JC/GS	Yes	Exterior sample for comparison.
6	Field blank	NA	NA	2017-04-612	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-613	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-614	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-615	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 2, University of Toronto, April 17, 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	2158	Seating Area	East	2017-04-601	5	15.04	10:10	11:29	79	1188	2.5	0.001	JC/GS	Yes	Not Occupied.
2	2158	Seating Area	West	2017-04-602	6	14.94	10:16	11:31	75	1121	5	0.002	JC/GS	Yes	Not Occupied.
2	2159	Lobby	Central	2017-04-603	4	14.97	10:20	11:34	74	1108	4	0.002	JC/GS	Yes	Not Occupied.
2	2159S	Stairwell	Central	2017-04-604	3	14.94	10:23	11:36	73	1091	4	0.002	JC/GS	Yes	Not Occupied.
2	2153K	Hallway	Central	2017-04-605	1	15.01	10:28	11:42	74	1111	3	0.001	JC/GS	Yes	Not Occupied.
	Exterior Control	NA	North of Medical Sciences Building	2017-04-610	5	15.04	14:40	15:50	70	1053	4	0.002	JC/GS	Yes	Exterior sample for comparison.
	Exterior Control	NA	South of Medical Sciences Building	2017-04-611	6	14.94	14:46	15:57	71	1061	3	0.001	JC/GS	Yes	Exterior sample for comparison.
6	Field blank	NA	NA	2017-04-612	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-613	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-614	NA	NA	NA	NA	NA	NA	0	Not applicable	Not applicable	Not applicable	Required as per NIOSH Method 7400.
6	Field Blank	NA	NA	2017-04-615	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

PUMP CALIBRATION SHEETS



Pump Calibration Form

Calibration Device: BIOS DryCal DC Lite HV

Date: April 17, 2017

Name: Josh Hamilton

Temperature: 22°C

Barometric Pressure: 102kPa

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	15.01	15.01	15.00	15.01	16.51	13.51
MSB-2	14.99	14.99	14.97	14.98	16.48	13.48
MSB -3	14.95	14.93	14.93	14.94	16.44	13.44
MSB -4	14.97	14.97	14.98	14.97	16.47	13.47
MSB-5	15.04	15.04	15.03	15.04	16.54	13.54
MSB -6	14.97	14.93	14.92	14.94	16.44	13.44
MSB -7	15.00	15.03	15.08	15.04	16.54	13.54
MSB-8	14.95	14.96	15.01	14.97	16.47	13.47
MSB -9	14.96	14.93	14.97	14.95	16.45	13.45
MSB -10	15.15	15.10	15.10	15.12	16.62	13.62



Pump Calibration Form

Calibration Device: BIOS DryCal DC Lite HV

Date: April 18, 2017

Name: Josh Hamilton

Temperature: 22°C

Barometric Pressure: 102 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	14.92	15.04	15.06	14.99	16.49	13.49
MSB-2	15.14	15.04	14.99	15.06	16.56	13.56
MSB -3	14.97	15.02	15.03	15.01	16.51	13.51
MSB -4	14.94	15.01	15.00	14.98	16.48	13.48
MSB-5	14.98	15.10	15.07	15.05	16.55	13.55
MSB -6	14.96	15.01	15.02	14.99	16.49	13.49
MSB -7	14.98	15.02	15.01	15.00	16.50	13.50
MSB-8	14.90	14.99	14.96	14.95	16.45	13.45
MSB -9	14.97	14.98	15.01	14.98	16.48	13.48
MSB -10	15.10	15.02	15.03	15.05	16.55	13.55



Pump Calibration Form

Calibration Device: BIOS DryCal DC Lite HV

Date: April 20, 2017

Name: Josh Hamilton

Temperature: 22°C

Barometric Pressure: 102 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	15.01	15.02	15.04	15.02	16.52	13.52
MSB-2	14.90	15.12	14.95	14.97	16.47	13.47
MSB -3	14.90	15.07	15.00	14.98	16.48	13.48
MSB -4	15.17	14.99	14.99	15.05	16.55	13.55
MSB-5	14.97	15.05	15.00	15.01	16.51	13.51
MSB -6	15.07	15.04	15.02	15.04	16.54	13.54
MSB -7	15.01	15.01	15.02	15.01	16.51	13.51
MSB-8	15.05	15.04	15.01	15.03	16.53	13.53
MSB -9	15.15	15.04	15.02	15.07	16.57	13.57
MSB -10	14.98	15.05	15.03	15.02	16.52	13.52



Pump Calibration Form

Calibration Device: BIOS DryCal DC Lite HV

Date: April 22 2017

Name: Gleb Apolonski

Temperature: 6°C

Barometric Pressure: 1018 mBar

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	14.97	14.97	14.97	16.47	13.47
MSB-2	15.05	15.04	15.02	15.04	16.54	13.54
MSB -3	14.99	14.95	14.97	14.99	16.49	13.49
MSB -4	15.01	15	15.01	15	16.5	13.5
MSB-5	14.97	14.99	15	14.99	16.49	13.49
MSB -6	14.99	14.98	14.98	14.98	16.48	13.48
MSB -7	15.03	15.04	15.3	15.03	16.53	13.53
MSB-8	14.91	14.95	14.95	14.95	16.49	13.49
MSB -9	14.92	14.97	14.98	14.97	16.47	13.47
MSB -10	14.99	15	15.01	15	16.5	13.5
MSB 11	15.01	15	15	15	16.5	13.5
MSB 12						
MSB 14	14.99	14.95	14.96	14.97	16.47	13.47

Appendix C

PCM ANALYSIS EXAMPLE CALCULATION SHEET

PCM Air Sample Analysis

Project Name:	UofT Medical Sciences Building		
Project Number:	119917		
Sample ID:	2017-04-017	Sample Type:	Ambient
Sample Collected By:	JH	Date:	April 18 2017
Sample Analyzed By:	JC/GS	Date:	April 18 2017
Sample Location:	Room # 3222		
Start Time:	9:13	Sample Duration (min)	112
Finish Time:	11:05	Flow Rate (L/min)	14.98

Volume (V)	1678	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)	3.2	fibres/mm ²	E = (FCS/FLS)/RFA
Fibre Concentration (C)	0.001	fibres/cc	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