

**AIR QUALITY SURVEY
ONTARIO MINISTRY OF CITIZENSHIP,
RECREATION, AND TOURISM**

Prepared for:
Ontario Ministry of Citizenship, Recreation, and Tourism
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Environmental Testing & Consulting Services
INDUSTRIAL HYGIENE DIVISION

PROJECT PROFILE

Client Name: Ontario Ministry of Citizenship, Recreation, and Tourism

Address: 400 University Avenue
Toronto, Ontario
M7A 1T7

Telephone: (416) 314-7098

Contact: Mr. Serge Dillon

Survey Date: March 23, 2005

Tests Conducted: Temperature; relative humidity; carbon dioxide; carbon monoxide; total particulates; formaldehyde; ozone; mould and yeast.

EXECUTIVE SUMMARY

On March 23, 2005 air testing for temperature, relative humidity, carbon dioxide, carbon monoxide, total particulates, formaldehyde, ozone, and mould & yeast was conducted in the office areas of Ontario Ministry of Citizenship, Recreation, and Tourism, Toronto, Ontario. Tests were conducted at various locations the office building (refer tables 1-5, Appendix I).

Carbon monoxide results were 0 ppm. These were less than time-weighted average exposure value (TWAEV) of 35 ppm established by Ontario Ministry of Labour regulation 833/96. These were also below the 5 ppm criteria guideline of American Society of Heating, Refrigeration and Air- Conditioning Engineers (ASHRAE). Carbon dioxide levels were all below the TWAEV of 5000 ppm under Ontario Ministry of Labour regulation 833/96. Except for a few readings at 625-650 ppm, all the locations tested were at or below the 600 ppm criteria for fresh-make up air. All the reading were less than the ASHRAE Standard 62-89 guideline of 800 ppm. Within the occupied building, carbon dioxide levels are generally dependent upon such factors as occupancy and the size of work area relative to occupancy, fresh air intake, and the degree of recirculation. Temperature were within the optimum range of 20⁰ C-25⁰ C. Relative humidity levels were 18-22 %, and were less than the optimum comfortable range for winter months is 25-60 %.

Total particulates results were 0.003-0.019 mg/m³. These were less than time-weighted average exposure value (TWAEV) of 10.0 mg/m³ established by Ontario Ministry of Labour regulation 833/96. These were also below the 1.0 mg/m³ criteria guideline of American Society of Heating, Refrigeration and Air- Conditioning Engineers (ASHRAE) for non-industrial personnel. Formaldehyde results were all less than 0.05 ppm. These were less than time-weighted average exposure value (TWAEV) of 1 ppm established by Ontario Ministry of Labour regulation 833/96. These were also below the 0.1 ppm criteria guideline of American Society of Heating, Refrigeration and Air- Conditioning Engineers (ASHRAE) for non-industrial personnel. Ozone results were less than 0.025 ppm. These were less than time-weighted average exposure value (TWAEV) of 0.1 ppm established by Ontario Ministry of Labour regulation 833/96. These were also below the 0.1 ppm ASTER criteria guideline of Indoor Air Quality Guideline of Health Canada.

Results of the mould testing indicate that the airborne mould & yeast level for locations tested ranged between less than the limit of detection of the laboratory of 6 Colony forming

units (CFU/m³) and 13 CFU/m³. Results indicate that the outdoor sample gave result of 186 CFU/m³. The outdoor sample indicate presence of mainly Cladosporium mould, which is commonly found in the summer/fall season. The inside sample at Floor 6 (Lisa M), and Floor 5 (Stationary cabinet), refer table 5, Appendix I, indicate the presence of a single species of Aspergillius, and Stachybotrys mould respectively. There are no specific guideline for indoor mould level, but according to Health Canada, up to 150 CFU/m³ indoor is acceptable if there is a mixture of species reflective of outdoor air spores, and up to 500 CFU/m³ is acceptable if the species are mainly Cladosporium or other tree or leaf fungi. The Guideline also state that if more than 50 CFU/m³ of a single species (other than Cladosporium or Altemaria) are detected, there may be a reason for concern. Sample # 1, and 2 at Floor 6, and Floor 5 indicate presence of 13 CFU/m³ each of a single species of Aspergillius, and Stachybotrys mould respectively. Aspergillius can be found indoor (in carpet, tiles, sofas etc) as well outdoor. Stachybotrys is not found outdoor, and is found in indoor environment on drywalls, and tiles etc. Persistent presence of toxigenic (e.g. Stachybotrys atra, toxigenic Aspergillius, Penicillium and Fusarium spp) or amplification of mould require further investigation and action should be taken accordingly. It is recommended that further investigation/and or mould remediation be conducted around Stationary cabinet on Floor 5, further investigation/testing of mould be conducted around the Stationary cabinet and another areas of the floor. It should be noted that the above-mentioned testing is limited to number of samples and locations tested on the specific day of testing. The mould growth may be/or appear at areas where there is water intrusion/damage of high humidity. Any source of water leakage of high humidity need to be corrected and pro-active approach to mould issue is recommended.

**ONTARIO MINISTRY OF CITIZENSHIP, RECREATION, AND TOURISM
AIR QUALITY SURVEY**

1.0 INTRODUCTION

Recently, widespread attention has been drawn to potential hazards posed by the presence of airborne contaminants in non-industrial indoor environments. It is now recognised that non-industrial environments, such as private residences, offices, schools and commercial and public buildings are important places of air pollutant exposure. Major factors that have

contributed to the awareness of the quality of indoor air are:

- a trend towards tighter building construction, as incentives are given to conserve fuels;
- the presence of an increasingly complex array of synthetic chemicals used in buildings and insulating products, furnishings, consumer products and craft materials;
- the use of alternative heating systems which, if not properly installed or designed, can release combustion by-products;
- a recognition that prolonged exposure even to very low concentrations of chemical contaminants may result in delayed toxic effects; and
- the realization that a very high proportion of the average individual's time is spent indoors.

The physical symptoms commonly attributed to indoor air quality problems include headache, fatigue, shortness of breath, sinus congestion, skin irritation, dizziness, nausea, eye, nose, and throat irritation. Some individuals may be particularly susceptible to the effects of indoor contaminants, for instance:

- allergic or asthmatic individuals
- people with respiratory disease
- people whose immune systems are suppressed due to disease or other causes

Children and people with asthma may also be very susceptible to the effects of indoor air contaminants. The increasing spectre of asthma, sick building syndrome (SBS), and building-related illness has raised concerns that indoor bioaerosols and other aeroallergens such as house dust mites may play an important role in these, although this has not been clearly established. With SBS or building-related illnesses, associated biological hazards may include fungi, bacteria, microbiological contaminants. Excessive humidity is associated with increased prevalence of respiratory symptoms perhaps through promoting the growth of fungi and mites.

The quality of indoor air is influenced both by the quality of outdoor air and by the emission characteristics of indoor sources. Important pollutants present in the outdoor air include carbon monoxide, oxides of nitrogen, oxides of sulphur, particulate matter, ozone and lead. Internally generated airborne pollutants fall into three categories:

- those formed in combustion processes from heating and cooking e.g., carbon monoxide;

- those derived from construction materials and furnishings, e.g., formaldehyde;
- those related to human activity or presence, e.g., carbon dioxide.

A major potential source of carbon monoxide as a combustion by-product is gas-fired stoves. Formaldehyde is released from wood laminates and particleboard in which formaldehyde-containing resins have been used. Human metabolic activity influences air quality by reducing the concentration of oxygen and increasing the level of carbon dioxide. Respiration, perspiration and food preparation add water vapour to the indoor atmospheres. Increasingly, complaints made by occupants of some large buildings are linked with poor indoor air quality. The occurrence of some of these complaints (headache, fatigue, stuffiness and undue warmth) has been associated with elevated levels of carbon dioxide (CO₂). Clean outdoor air contains a background concentration of about 380 parts per million (ppm). Within the occupied buildings, CO₂ levels will generally be above this background level depending upon factors such as fresh air intake, degree of recirculation, occupancy and the size of the work area relative to occupancy. When insufficient air is brought into building, concentrations of air contaminants other than CO₂ such as those arising from smoking, body odours, dry cleaning solvents from clothing of workers, cleaning solvents and other chemicals used in the workplace will increase. At some point the odours from these contaminants will be perceived by the occupants as " stuffy " or " stagnant " air. In some cases, where allergy prone workers or those with hyperactive airways are concerned, low level air contamination may cause respiratory distress or eye irritation. This is particularly true when air contains dust. Since CO₂ concentrations also increase under conditions of insufficient ventilation, the concentration of CO₂ has been used by many investigators as an index of indoor air quality.

Relative humidity has also been considered as another indicator of indoor air quality. It is generally recognised that conditions of high humidity (above 60 % in winter) can lead to a feeling of discomfort. Low humidity can result in discomfort due to eye irritation, respiratory tract irritation and electrical shocks due to electrostatic discharges. Outdoor temperature determines to a large degree the moisture content of indoor air. Thus indoor air will tend to be dry during the winter months and high in humidity during the summer months unless incoming air is humidified during the winter or dehumidified during the summer. Because metabolic heat loss from the body occurs chiefly by way of evaporation,

high humidity during the summer slows body heat loss while low humidity during the winter speeds heat loss. Consequently, a common complaint during the summer months is air that is hot and " sticky " whereas during the winter, workers complaint of draughts and feel cold. In both situations relative humidity may be more important than temperature in determining worker comfort. The American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) recommends that relative humidity of 25-60 % and temperature of 20-25°C be maintained for office buildings during the winter weather.

This report pertains to the testing of air quality parameters: temperature, relative humidity, carbon dioxide, carbon monoxide, total particulates, formaldehyde, ozone, and mould & yeast in the office areas of Ontario Ministry of Citizenship, Recreation, and Tourism, Toronto, conducted on March 23, 2005. This was in response to an inquiry concerning these by Serge Dillon of the Ministry. The survey was performed in compliance with standard procedures as established by the industrial hygiene profession.

The objective of the air quality survey was to test air quality parameters: temperature, relative humidity, carbon dioxide, carbon monoxide, total particulates, formaldehyde, ozone, and mould & yeast in the office areas. These were based on contaminants that could potentially be emitted from furniture, office equipments, carpeting, normal office work practices, human metabolism, and building's mechanical system for climatic control.

2.0 SAMPLE TYPE & LOCATIONS

After an assessment of the office lay-out and a walk-through survey, it was decided to take direct reading tests for temperature, relative humidity, carbon dioxide, carbon monoxide, total particulate at various locations for the morning and afternoon (to track changes). Mould and yeast, formaldehyde, and ozone tests were taken on each floor. Locations and results for these are given in Appendix I (tables 1-5).

Area sampling was utilized because it provides information of contamination for a specific location. Personal sampling (breathing zone) is normally utilized primarily because it provides a representative sample of an individual's exposure.

3.0 METHODS & MATERIALS

Direct reading measurements for temperature, relative humidity, carbon dioxide, and carbon monoxide were conducted by means of TSI Q-Trak indoor air quality monitor. Total particulates measurements were taken by TSI-DustTrak Particulate Monitor. Ozone measurements were conducted by means of Gastec Indicating Tubes 118L. Formaldehyde tests were conducted by means of Gastec Passi-Dosi Tubes 91D.

Air sampling for mould & yeast was conducted by drawing air through sterile strips by means of Biotest RCS air sampler calibrated at 40 L/min. The sterile strips were given by analytical laboratory. These were analyzed by for the identification and total count by Sporometrics Ltd.

4.0 RESULTS AND DISCUSSION

4.1 Carbon Monoxide

The locations tested on the day of the testing gave results of 0 ppm for the both the morning and afternoon tests. All the locations tested for gave results which were below the time-weighted average exposure value (TWAEV) of 35 ppm established by Ontario Ministry of Labour regulation 833/96 regarding exposure of chemical agents to industrial workers. These were also less than the American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) criteria guideline value of 5 ppm for non-industrial workers. ASHRAE values are generally 10 times lower than the threshold limit value (TLV) established by the Ontario Ministry of Labour.

4.2 Carbon Dioxide

Carbon dioxide concentrations on the day of testing for the locations tested ranged from 450 to 650 ppm.

According to the Ontario Ministry of Labour, guidelines for CO₂ concentrations are as follows:

CO₂ (ppm)	Comment
Less than 600	Adequate fresh air
600 - 800	Occasional complaints
800 - 1000	Complaints more prevalent
Greater than 1000	Insufficient make-up air
	General complaints
5000	Maximum allowable
	Time Weighted Average
	Exposure Value (TWAEV)

All the readings taken were below the maximum allowable TWAEV of 5000 ppm. Carbon dioxide readings mostly ranged between 500 to 600 ppm for both the morning and afternoon tests. Most of the readings were at or below 600 ppm threshold for adequate fresh make-up air except for a few locations which gave reading of 625-650 ppm. Most of the buildings HVAC system are designed according to ASHRAE standard 62-89 of 20 cfm/person outside air. This works out approximately 800 ppm based on the outside level of 370 ppm. Average outside readings of carbon dioxide were 395 ppm. Levels of 1000 ppm and greater indicate insufficient fresh air. Within the occupied building, carbon dioxide levels are generally dependent upon such factors as size of the work area relative to occupancy, fresh air intake, and degree of recirculation. It was observed on the day of testing that there were more occupants at the time of the testing at the above locations relative to the work area as compared to number of occupants relative to other areas of the building.

4.3 Temperature and Relative Humidity

Temperature readings ranged between 22.0⁰C and 23.7⁰C for the locations tested for both the tests. All the readings were within the optimum comfortable range of 20-25⁰ C.

Relative Humidity levels were between 18 % and 22 %. These were lower than the thermal comfortable range of 25 % to 60 % for temperature range of 20⁰ C to 25⁰ C for summer conditions. It was observed that the outside relative humidity was 23 % and 27 % in the morning and afternoon respectively.

4.4 Total particulates

The locations tested on the day of the testing gave results of 0.003-0.019 mg/m³. All the locations tested for gave results which were below the time-weighted average exposure value (TWAEV) of 10.0 mg/m³ established by Ontario Ministry of Labour regulation 833/96 regarding exposure of chemical agents to industrial workers. These were also less than the American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) criteria guideline value of 1.0 mg/m³ for non-industrial workers. ASHRAE values are generally 10 times lower than the threshold limit value (TLV) established by the Ontario Ministry of Labour.

4.5 Formaldehyde

The locations tested on the day of the testing gave results of which were less than the detection limit of 0.05 ppm of the Passi-Dosi Gastec 91D indicating tube. All the locations tested for gave results which were below the time-weighted average exposure value (TWAEV) of 1 ppm established by Ontario Ministry of Labour regulation 833/96 regarding exposure of chemical agents to industrial workers. These were also less than the American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) criteria guideline value of 0.1 ppm for non-industrial workers. ASHRAE values are generally 10 times lower than the threshold limit value (TLV) established by the Ontario Ministry of Labour.

4.6 Ozone

The locations tested on the day of the testing gave results of less than the detection limit of the indicating tube of 0.025 ppm. All the locations tested for gave results which were below the time-weighted average exposure value (TWAEV) of 0.1 ppm established by Ontario Ministry of Labour regulation 833/96 regarding exposure of chemical agents to industrial workers. These were also less than the Acceptable Exposure Range (ASTER) of 0.1 ppm of Indoor Air Quality Guideline by Health Canada.

4.7 Mould & Yeast

The results of the testing indicate that the airborne mould & yeast level on the day of testing for the locations tested ranged between less than the limit of detection of the laboratory of 6 Colony forming units (CFU/m³) and 13 CFU/m³. Results indicate that the outdoor sample gave result of 186 CFU/m³. The outdoor sample indicate presence of mainly Cladosporium mould, which is commonly found in the summer/fall season. The inside sample at Floor 6, and 5 (refer table 5, Appendix I) indicate the presence of a single species of Aspergillus, and Stachybotrys mould respectively. There are no specific guideline for indoor mould level, but according to Health Canada, up to 150 CFU/m³ indoor is acceptable if there is a mixture of species reflective of outdoor air spores, and up to 500 CFU/m³ is acceptable if the species are mainly Cladosporium or other tree or leaf fungi. The Guideline also state that if more than 50 CFU/m³ of a single species (other than Cladosporium or Altemaria) are detected, there may be a reason for concern. Sample # 1 (Lisa M) at Floor 6, and Floor 5 (Stationary cabinet) indicate presence of 13 CFU/m³ each of a single species of Aspergillus, and Stachybotrys mould respectively. Aspergillus can be found indoor (in carpet, tiles, sofas etc) as well outdoor. Stachybotrys is not found outdoor, and is found in indoor environment on drywalls, and tiles etc. Persistent presence of toxigenic (e.g. Stachybotrys atra, toxigenic Aspergillus, Penicillium and Fusarium spp) or amplification of mould require further investigation and action should be taken accordingly. It is recommended that further investigation/and or mould remediation be conducted around Stationary cabinet on Floor 5, further investigation/testing of mould be conducted around the Stationary cabinet and another areas of the floor. It should be noted that the above-mentioned testing is limited to number of samples and locations tested on the specific day of testing. The mould growth may be/or appear at areas where there is water intrusion/damage of high humidity. Any source of water leakage of high humidity need to be corrected and pro-active approach to mould issue is recommended.

APPENDIX - I

**Tables 1-5
Temperature, Relative Humidity, CO₂, CO
Total particulates, Formaldehyde, Ozone
Mould & Yeast**

TABLE 1 RESULTS OF TESTING - Air Quality Indicators**Temperature, Relative Humidity, Carbon dioxide, & Carbon monoxide**

LOCATION	TIME	Temp. (°C)	R.H. (%)	CO ₂ (ppm)	CO (ppm)
<u>Floor 6</u>					
1. Scott P.A. Office	10:30	22.1	21	575	0
	12:30	22.0	20	550	0
	14:30	22.1	20	550	0
2. Minister's Office	10:31	22.1	20	550	0
	12:31	22.0	21	500	0
	14:31	22.2	21	525	0
3. Minister's Office (Back)	10:32	22.6	20	500	0
	12:32	22.3	19	525	0
	14:32	22.7	20	600	0
4. Reception	10:33	22.8	20	600	0
	12:33	22.3	19	600	0
	14:33	22.8	20	550	0
5. Deputy Minister Office	10:34	22.8	20	525	0
	12:34	22.6	19	550	0
	14:34	22.7	19	500	0
6. Linda Jones	10:35	22.3	20	550	0
	12:35	22.3	19	550	0
	14:35	22.6	20	525	0
7. Steve Sharpe 0	10:36	22.4	21	575	0
	12:36	22.2	20	550	0
	14:36	22.6	20	550	0
8. Rosemary Perkin	10:37	22.6	21	600	0
	12:37	22.4	19	575	0
	14:37	22.5	20	550	0

RESULTS OF TESTING: TABLE 1- Air Quality Indicators**Temperature, Relative Humidity, Carbon dioxide, & Carbon monoxide**

LOCATION	TIME	Temp. (°C)	R.H. (%)	CO ₂ (ppm)	CO (ppm)
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9. Micky Trimaico	10:38	23.2	22	575	0
	12:38	22.5	19	550	0
	14:38	22.7	20	600	0
Floor 5					
10. Eddy Yonifshy	10:39	22.7	21	575	0
	12:39	22.5	19	525	0
	14:39	23.7	20	550	0
0					
11. Neil Balot	10:40	22.4	20	550	0
	12:40	22.6	19	525	0
	14:40	22.7	20	525	0
12. Malisa Gibson	10:41	22.5	20	575	0
	12:41	22.7	19	525	0
	14:41	22.6	20	550	0
0					
13. Dawna Barret	10:42	22.4	19	525	0
	12:42	22.5	19	500	0
	14:42	22.7	21	550	0
14. Judy Redness	10:43	22.5	20	575	0
	12:43	22.4	21	550	0
	14:43	22.6	21	525	0
15. Law Lib.	10:44	22.1	20	550	0
	12:44	22.8	19	525	0
	14:44	22.6	20	550	0
16. Pat Adam	10:45	22.3	20	550	0
	12:45	22.6	19	525	0
	14:45	22.7	21	550	0

TABLE 1 RESULTS OF TESTING - Air Quality Indicators

Temperature, Relative Humidity, Carbon dioxide, & Carbon monoxide

LOCATION	TIME	Temp. (°C)	R.H. (%)	CO ₂ (ppm)	CO (ppm)
17. Penny Finneron	10:46	22.8	20	550	0
	12:46	22.5	21	500	0
	14:46	22.7	20	550	0

Floor 4

18. Serge Dillon	10:47	23.2	20	600	0
	12:47	23.4	19	575	0
	14:47	23.1	20	550	0
19. Derwin Mak	10:48	23.2	20	575	0
	12:48	23.5	21	550	0
	15:48	23.3	21	550	0
20. Leela Gurpersuad	10:49	23.2	20	550	0
	12:49	23.3	19	550	0
	14:49	23.6	20	500	0
21. Rod Sawyer	10:50	23.5	20	550	0
	12:50	23.3	19	575	0
	14:50	23.6	21	525	0
22. Mima Vilielis	10:51	22.9	20	575	0
	12:51	23.1	19	575	0
	14:51	23.3	20	550	0
23. Bryan Ozorio 0 575	10:52	23.7	20	575	
			12:52	22.8	1 9
	14:52	23.1	20	550	0
24. Scott Cooper	10:53	23.5	20	575	0
	12:53	23.1	20	600	0
	14:53	23.4	19	575	0

TABLE 1 RESULTS OF TESTING - Air Quality Indicators
Temperature, Relative Humidity, Carbon dioxide, & Carbon monoxide

LOCATION	TIME	Temp. (°C)	R.H. (%)	CO ₂ (ppm)	CO (ppm)
25. Anita Conella 19	10:54	22.9	20	575	0
				12:54	22.7
	14:54	22.7	21	600	0
26. Multi-media	10:55	22.8	20	625	0
	12:55	23.2	19	575	0
	14:55	23.1	21	600	0

27. Chris Anderson	10:56	22.4	19	600	0
	12:56	22.9	19	575	0
	14:56	22.7	20	550	0
28. Daniel O'Brien	10:57	23.3	20	625	0
	12:57	23.1	19	575	0
	14:57	23.5	21	550	0
<u>Floor 3</u>					
29. Rita Thadani	11:00	22.8	20	575	0
	13:00	23.4	19	550	0
	15:00	22.6	21	600	0
30. Guenther Zuerin 0		11:01	22.6	19	550
	13:01	22.5	20	525	0
	15:01	23.1	20	575	0
31. Gord Durrant	11:02	22.7	19	550	0
	13:00	22.5	20	525	0
	15:00	23.0	19	550	0
32. Maggie Malloch 0		11:03	22.7	19	550
	13:03	22.6	20	525	0
	15:03	22.7	20	525	0

TABLE 1 RESULTS OF TESTING - Air Quality Indicators

Temperature, Relative Humidity, Carbon dioxide, & Carbon monoxide

LOCATION	TIME	Temp. (°C)	R.H. (%)	CO ₂ (ppm)	CO (ppm)
33. Paul Foster	11:04	22.0	20	600	0
	13:04	22.4	21	550	0
	15:04	22.5	20	525	0
34. Margaret Speers	11:05	22.2	20	625	0
	13:05	22.4	19	575	0
	15:05	22.6	20	550	0
35. Jim Dixon	11:06	22.2	19	600	0
	13:06	22.5	20	550	0
	15:06	22.4	20	550	0

36. Susan Brooks	11:07	22.2	19	650	0
	13:07	22.3	20	600	0
	15:07	22.5	19	550	0
37. Diana Abraham	11:08	22.2	20	575	0
	13:08	22.5	19	600	0
	15:08	22.4	20	575	0
38. Jim Tait	11:09	22.3	20	575	0
	13:09	22.4	19	525	0
	15:09	22.6	20	550	0
39. Tanya Russel 0	11:10	22.8	19	575	0
	13:10	22.6	20	600	
	15:10	23.0	20	550	0
<u>Floor 2</u>					
40. Rob Thomson	11:11	22.6	20	575	0
	13:11	22.5	19	550	0
	15:11	22.7	20	550	0

RESULTS OF TESTING: TABLE 1- Air Quality Indicators

Temperature, Relative Humidity, Carbon dioxide, & Carbon monoxide

LOCATION	TIME	Temp. (°C)	R.H. (%)	CO ₂ (ppm)	CO (ppm)
41. Flrie Lui	11:12	22.6	20	575	0
	13:12	22.7	19	550	0
	15:12	22.6	19	550	0
42. Maria DeMalo 0	11:13	22.6	20	575	0
	13:13	22.5	19	600	0
	15:13	22.7	20	575	
43. David Shutra	11:14	22.4	20	575	0
	13:14	22.5	19	600	0
	15:14	22.7	19	600	0
44. Teresa Yu 0	11:15	22.6	20	550	0
	13:15	22.6	19	500	
	15:15	22.8	20	575	0

45. Heather Owen	11:16	22.6	22	575	0
	13:16	22.4	20	550	0
	15:16	22.7	21	550	0
46. Sharon Khan	11:17	22.5	20	600	0
	13:17	22.4	21	550	0
	15:17	22.6	20	550	0
47. Arlene Dana 0	11:18	23.1	22	600	0
	13:18	22.8	19	525	
	15:18	22.9	20	575	0
48. Chris Stock	11:19	23.1	20	650	0
	13:19	22.7	19	500	0
	15:19	23.0	21	575	0

TABLE 1 RESULTS OF TESTING - Air Quality Indicators

Temperature, Relative Humidity, Carbon dioxide, & Carbon monoxide

<u>LOCATION</u>	<u>TIME</u>	<u>Temp. (°C)</u>	<u>R.H. (%)</u>	<u>CO₂ (ppm)</u>	<u>CO (ppm)</u>
49. Raymond Yim	11:20	23.4	20	625	0
	13:20	23.0	20	550	0
	15:20	23.2	21	575	0
50. Kevin Zizman	11:21	23.5	20	600	0
	13:21	22.8	19	575	0
	15:21	23.2	20	550	0
51. Krystana Gil	11:22	23.2	20	600	0
	13:22	23.1	19	550	0
	15:22	23.2	19	600	0
<u>Basement</u>					
52. Storage	11:25	23.2	19	500	0
	13:23	23.1	19	525	0
	15:23	23.3	20	550	0
53. Print Room	11:26	23.5	19	450	0
	13:24	23.2	19	500	0
	15:24	23.3	20	525	0
<u>Floor 1</u>					

54. Rick Beaver	11:30	22.7	18	525	0
	13:30	22.4	18	550	0
	15:30	22.8	19	500	0
55. Edna 0 18	11:31	22.7	18	550	22.5
		Namocehat		13:31	
	500	0			
	15:31	22.9	19	525	0
56. Sue Yousef	11:32	22.6	19	550	0
	13:32	22.4	19	600	0
	15:33	22.8	20	575	0

TABLE 1 RESULTS OF TESTING - Air Quality Indicators

Temperature, Relative Humidity, Carbon dioxide, & Carbon monoxide

LOCATION	TIME	Temp. (°C)	R.H. (%)	CO ₂ (ppm)	CO (ppm)
57. Rick Gomes 19	11:35	22.8	18	550	0
				13:35	22.6
	500	0			
	15:35	22.7	19	550	0
58. Production (N)	11:36	22.8	18	525	0
	13:36	22.6	19	550	0
	13:36	22.6	19	575	0
59. Production (S)	11:37	22.7	18	525	0
	13:37	22.6	18	550	0
	15:37	22.7	19	525	0

TABLE 2 RESULTS OF TESTING - Air Quality Indicators

Total particulates

LOCATION	TIME	Total particulates (mg/m ³)
<u>Floor 6</u>		
1. Scott P.A. Office	10:30	0.004
2. Minister's Office	10:31	0.006
3. Minister's Office (Back)	10:32	0.003
4. Reception	10:33	0.005
5. Deputy Minister Office	10:34	0.006
6. Linda Jones	10:35	0.007
7. Steve Sharpe	10:36	0.006
8. Rosemary Perkin	10:37	0.005
9. Micky Trimaico	10:38	0.007
<u>Floor 5</u>		
10. Eddy Yonifshy	10:39	0.008
11. Neil Balot	10:40	0.011
12. Malisa Gibson	10:41	0.006
13. Dawna Barret	10:42	0.007
14. Judy Redness	10:43	0.008

TABLE 2 RESULTS OF TESTING - Air Quality Indicators

Total particulates

LOCATION	TIME	Total particulates (mg/m ³)
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15. Law Lib.	10:44	0.006
16. Pat Adam	10:45	0.007
17. Penny Finneron	10:46	0.009
<u>Floor 4</u>		
18. Serge Dillon	10:47	0.011
19. Derwin Mak	10:48	0.009
20. Leela Gurpersaud	10:49	0.009
21. Rod Sawyer	10:50	0.010
22. Mima Vilielis	10:51	0.008
23. Bryan Ozorio	10:52	0.009
24. Scott Cooper	10:53	0.010
25. Anita Conella	10:54	0.008
26. Multi-media Room	10:55	0.009
27. Chris Anderson	10:56	0.008
28. Daniel O'Brien	10:57	0.009
<u>Floor 3</u>		
29. Rita Thadani	11:00	0.011

TABLE 2 RESULTS OF TESTING - Air Quality Indicators

Total particulates		
LOCATION	TIME	Total particulates (mg/m ³)
30. Guenther Zuerin	11:01	0.009
31. Gord Durrant	11:02	0.008
32. Maggie Malloch	11:03	0.009

33. Paul Foster	11:04	0.010
34. Margaret Speers	11:05	0.009
35. Jim Dixon	11:06	0.007
36. Susan Brooks	11:07	0.009
37. Diana Abraham	11:08	0.011
38. Jim Tait	11:09	0.008
39. Tanya Russel	11:10	0.009
<u>Floor 2</u>		
40. Rob Thomson	11:11	0.007
41. Flrie Lui	11:12	0.011
42. Maria DeMalo	11:13	0.009
43. David Shutra	11:14	0.008
44. Teresa Yu	11:15	0.007
45. Heather Owen	11:16	0.009

TABLE 2 RESULTS OF TESTING - Air Quality Indicators

Total particulates		
LOCATION	TIME	Total particulates (mg/m³)
46. Sharon Khan	11:17	0.011
47. Arlene Dana	11:18	0.014
48. Chris Stock	11:19	0.010
49. Raymond Yim	11:20	0.009
50. Kevin Zizman	11:21	0.011
51. Krystana Gil	11:22	0.012

Basement

52. Storage	11:25	0.014
53. Print Room	11:26	0.019

Floor 1

54. Rick Beaver	11:30	0.010
55. Edna Namocehat	11:31	0.011
56. Sue Yousef	11:32	0.008
57. Rick Gomes	11:35	0.009
58. Production (N)	11:36	0.008
59. Production (S)	11:37	0.007

RESULTS OF TESTING: TABLE 3- Formaldehyde

<u>LOCATION</u>	<u>Start Time (Hrs.)</u>	<u>Finish Time (Hrs.)</u>	<u>Sampling Duration (min.)</u>	<u>Airborne Concn. (ppm)</u>
Linda Jones (Floor 6)	10:35	14:35	180	<0.05
Dawna Barrett (Floor 5)	10:42	14:42	180	<0.05
Scott Cooper (Floor 4)	10:53	14:53	180	<0.05
Paul Foster (Floor 3)	11:04	15:04	180	<0.05
Sharon Khan (Floor 2)	11:17	15:17	180	<0.05
Storage (Basement)	11:25	15:25	180	<0.05

Sue Yousef (Floor 1)	11:32	15:32	180	<0.05
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Note: < denotes less than the detection limit.

RESULTS OF TESTING: TABLE 4- Ozone

LOCATION	Start Time (Hrs.)	Sampling Volume (cc)	Airborne Conc. (ppm)
Photocopier (Floor 6)	12:35	200	<0.025
Photocopier (Floor 5)	12:42	200	<0.025
Scott Cooper (Floor 4)	12:53	200	<0.025
Photocopier (Floor 3)	13:04	200	<0.025
Photocopier (Floor 2)	13:17	200	<0.025
Storage (Basement)	13:25	200	<0.025
Sue Yousef (Floor 1)	11:32	200	<0.025

Note: < denotes less than the detection limit.

TABLE 5 RESULTS OF TESTING - Airbourne Mould

Re: Analysis of RCS Biotest air samples for fungi, client proj.Ministry of Citizenship

SAMPLE NO.	1	2	3	4	5	6	7
Volume (L):	160	160	160	160	160	160	160
LOD (CFU/m3):	6	6	6	6	6	6	6
Location:	fl.6 Lisa M.	fl.5 stationary cabinet	fl.4 Serge D.	fl.3 Paul F.	fl.2 handicap washroom	fl.1 filing cabinet	outside
Expiry Date:	21 May 05	21 May 05	21 May 05	21 May 05	21 May 05	21 May 05	21 May 05
FUNGAL IDENTIFICATION		COMPOSITION (CFU/m3)					
<i>Alternaria</i> sp.	-	-	-	-	-	-	6
<i>Aspergillus ochraceus</i> group	13	-	-	-	-	-	-
<i>Chaetomium</i> sp.	-	-	-	-	-	-	6
<i>Cladosporium cladosporioides</i>	-	-	-	-	-	6	81
<i>Epicoccum nigrum</i>	-	-	-	-	-	-	6
<i>Eurotium</i> sp.	-	-	-	-	-	-	6
<i>Phoma</i> sp.	-	-	-	-	-	-	6
<i>Stachybotrys chartarum</i>	-	13	-	-	-	-	-
sterile mycelium	-	-	-	6	-	-	19
<i>Tritirachium</i> sp.	-	-	-	-	-	-	6
yeast	-	13	-	-	6	-	50
TOTAL (CFU/m3):	13	26	< LOD	6	6	6	186

AIHA EMPAT NO: 171117

END OF REPORT