Ambient Particulate Matter Concentrations in Canada and Background Levels

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Implications

Studies have shown that ambient concentrations of particulate matter in Canadian cities are at levels that are of concern to human health. Current ambient air quality standards and objectives are set at levels that are not entirely protective of human health. In view of the absence of threshold effects associated with exposure to fine particulate matter, the Canadian Federal-Provincial Working Group on Air Quality Objectives and Guidelines has suggested that background levels be used as targets for emission reductions. This document compares ambient PM concentrations in Canadian cities to published background levels for Canada and the United States and discusses them in the context of airshed management.

Répércussions

Les études indiquent que les concentrations de particules dans l'air ambiant des villes canadiennes ont atteint des niveaux préoccupants pour la santé humaine. À l'heure actuelle, les normes et les objectifs liés à la qualité de l'air ambiant sont établis à des niveaux qui ne protègent pas complètement la santé humaine. Compte tenu de l'absence d'effets de seuil associés à l'exposition à la poussière fine, le groupe de travail fédéral-provincial sur les objectifs et les lignes directrices de la qualité de l'air a suggéré d'utiliser les niveaux naturels en guise de cibles pour assurer la réduction des émissions. Dans le document, les concentrations de particules dans l'air ambiant des villes canadiennes sont comparées aux niveaux naturels publiés pour le Canada et les États-Unis et invoquées dans le contexte de la gestion du bassin atmosphérique.

Abstract

Studies have shown that ambient concentrations of particulate matter in Canadian cities are at levels that are of concern to human health. Current ambient air quality standards and objectives are set at levels that are not entirely protective of human health. In view of the absence of threshold effects associated with exposure to fine particulate matter, the Federal-Provincial Working Group on Air Quality Objectives and Guidelines has suggested that background levels be used as targets for reduction. Background values for particulate matter have been published by regulatory agencies in both United States and Canada. While US background values were determined based on assessments of natural trace species and extensive monitoring at background sites within the United States, Canadian values were for the most part adopted from US studies and relied on an assessment of a limited number of rural sites located in eastern Canada. An analysis of particulate matter data from NAPS stations across Canada indicated that most stations had concentrations above currently published background levels for both PM10 and PM2.5. A small number of stations had concentrations below background levels and these were located for the most part in western Canada. In British Columbia, most stations had annual concentrations within 7-10 ug/m^3 of background for PM10 and within 3-4 ug/m^3 for PM2.5. Western Canadian stations with annual PM averages within the range of background levels were generally located in semi-rural or well ventilated coastal locations receiving relatively high levels of precipitation. The validity of applying currently published background levels to Canadian PM

data is questionable based on the lack of background PM data for this country, which precludes the ability to obtain accurate estimates of background levels at this time. Although a small number of NAPS stations have relatively low annual particulate matter concentrations, the data indicate that for many Canadian municipalities the target of background will be difficult to achieve in the near future, especially in areas with large urban centers, or those affected by transboundary pollution. As an alternative to targeting broadly derived background levels, these municipalities could develop interim targets based on local background concentrations for their specific airsheds.

Résumé

Les valeurs naturelles des particules ont été publiées par les organismes de réglementation, à la fois aux États-Unis et au Canada. Lorsqu'on analyse les données sur les particules recueillies par les stations du Réseau national de surveillance de la pollution atmosphérique (RNSPA), on s'aperçoit que la plupart ont des concentrations supérieures aux niveaux naturels actuellement publiés pour les particules de moins de 10 microns (MP10) et les particules de moins de 2,5 microns (MP2,5). Seules quelques stations affichent des concentrations inférieures aux niveaux naturels et la plupart de situent dans l'Ouest canadien. Dans la majorité des stations de la Colombie-Britannique, les concentrations annuelles se situent entre 7 et 10 µg/m3 pour la MP10 et entre 3 et 4 µg/m3 pour la MP2,5. D'une façon générale, les stations de l'Ouest canadien affichant des moyennes de concentrations de particules de l'ordre des niveaux naturels se situent dans les lieux semi ruraux ou côtiers bien aérés qui reçoivent beaucoup de précipitations. Bien qu'un petit nombre de stations ait des concentrations de particules annuelles relativement faibles, les données indiquent que, dans de nombreuses municipalités canadiennes, il serait difficile d'atteindre la cible définie par les organismes de réglementation du Canada, notamment dans les zones situées dans les grands centres urbains ou touchées par la pollution transfrontière. Outre la difficulté d'appliquer des niveaux naturels sommairement dérivés à des bassins atmosphériques individuels, il faut aussi compter sur l'incertitude associée aux valeurs numériques des niveaux naturels dérivés calculées pour le Canada. Alors qu'aux É.-U., les valeurs naturelles ont été déterminées d'après l'évaluation des corps à l'état de trace et une surveillance poussée, au Canada, les valeurs proviennent surtout d'études américaines et s'appuient sur l'évaluation d'un nombre limité de sites ruraux de l'est du Canada. Dans les stations canadiennes, les améliorations apportées aux mesures de concentration de particules devraient contribuer à combler les lacunes statistiques, ce qui donnera lieu à une évaluation plus rigoureuse des niveaux naturels au Canada.

Introduction

Ambient particulate matter is emerging as a prominent environmental health issue. Although it has been known for some time that high concentrations of fine particles in air can adversely affect susceptible individuals, recent findings show that human health is adversely affected even at ambient concentrations, such as those existing in cities across Canada and the United States (CEPA, 1998). A nationwide study conducted by the Health Effects Institute, which examined 90 of the largest cities in the United States, found that mortality increased by 0.5 percent for every 10 ug/m^3 increase in PM10 measured the day before death (Samet et al., 2000). In another study addressing impacts of air quality in British Columbia, elevated PM levels were linked to increased hospitalizations for lung, heart and asthma disorders, increased visits to emergency rooms and increased school absenteeism (Vedal, 1995). In recognition of the health threat posed by fine particulate matter, both federal and provincial governments have developed policy instruments to address the risk to human health.

Air Quality Standards and Objectives

In June 2000, a Canada Wide Standard (CWS) for particulate matter was established for PM2.5, pursuant to the 1998 Canada Wide Accord on Environmental Harmonization of the Canadian Council of Ministers of the Environment (CCME) and the Canada-Wide Environmental Standards Sub-Agreement (MSC, 2001). The standard was established in response to the demonstration of significant effects of PM2.5 on human health and the environment. The CWS for PM2.5 was set at 30 ug/m^3, 24 hour averaging time, to be achieved by the year 2010. Achievement is based on the 98th percentile annual measurement averaged over 3 consecutive years.

The province of British Columbia has adopted it's own air quality objective for PM10, set at 50 ug/m^3, based on a 24 hour averaging time. British Columbia's air quality objectives are applied as discretionary criteria for Ministry Regional Managers in permitting processes under the Waste Management Act and in project review referrals under the British Columbia Environmental Assessment Act (RWDI, 2002). The value of the air quality objective for PM10 is also employed in the air quality index. No provincial objective currently exists for PM2.5.

Although federal air quality standards and provincial objectives are useful in identifying airsheds requiring immediate action for air quality improvement, current scientific knowledge indicates that these levels are not protective of human health. In addition, both increased mortality and increased morbidity have been associated with ambient concentrations of particulate matter similar to those measured in Canadian cities (CEPA, 1998). In response to this concern, the federal government called for a reexamination of particulate matter air pollution and its possible consequences on human health. This resulted in the development of Health Reference Levels for fine particulate matter (CEPA, 1998).

Health Reference Levels

Health Reference levels were derived on the basis of recommendations from the Federal-Provincial Working Group on Air Quality Objectives and Guidelines (WGAQOG) to assist with the development of Canada Wide Standards for fine particulate matter. Health Reference Levels are scientifically based and were developed with the recognition that there are no threshold limits for particulate matter effects on human health.

Numerical values assigned to health reference levels were derived on the basis of the statistical Lowest Observed Adverse Effect Level (LOAEL), which represents the level above which effects on human health and the environment can be demonstrated with statistical confidence. Because health effects occur at levels below the reference level and a safe level of exposure to particulate matter cannot be identified, the reference level should not be interpreted as a threshold effect, but rather as a guideline in estimating risk from ambient levels of particulate matter. On the basis of this assessment, the WGAQOG determined Health Reference Levels of 25 and 15 ug/m^3 for PM10 and PM2.5, respectively, based on a 24 hour averaging time (CEPA, 1998). It's expected that these reference values will decrease with further research on health effects at lower concentrations and better statistical analysis of the dose-response relationship at low concentrations.

Since Reference Levels are based on the LOAEL and therefore have no safety factors, they represent the most conservative estimates of the effect level. In defining a safe level of human exposure, it is customary to use the No Observed Adverse Effects Level (NOAEL). In this situation where a NOAEL has not been identified but the effects data are of sufficient quality to allow a derivation of the LOAEL, then a "virtually safe level" can be derived by applying uncertainty factors to the LOAEL. By applying a safety factor of two, the WGAQOG determined that the targets which would substantially reduce the risks to human health for PM10 and PM2.5 are 12.5 and 7.5 ug/m^3, respectively, based on 24 hour averaging time. Since these targets are fairly close to the range of 24 hour concentrations associated with background levels in the US,

the WGAQOG has suggested that background levels are appropriate targets for reducing risks to human health (CEPA, 1999).

Background Levels

Understanding the background level of particulate matter is of importance to policy makers, as it represents the fraction of pollution which is beyond human control. In common usage, the term background level refers to the concentration observed in remote areas relatively unaffected by local pollution sources. However, in a policy relevant context, the background concentration must take into account contributions from uncontrollable sources that can affect local concentrations. In this context, background particulate matter can be defined as the concentration resulting from local natural sources, transported natural and anthropogenic sources from within North America and long range transported natural and anthropogenic sources from outside of North America.

Several studies have provided estimates of the background level of particulate matter in North America. Trijonis et al. (1990) characterized the background aerosol concentration for the eastern and western United States based on an analysis of natural trace species. Natural background concentrations were estimated from compilations of natural and anthropogenic emission levels, ambient measurements in remote areas and regression studies using anthropogenic and or natural tracers. Background concentrations were estimated for both coarse particles and for six major components of fine aerosols: sulfates, organics, elemental carbon, ammonium nitrate, soil dust and water. Based on this analysis, the annual average natural background level for PM10 was estimated at 6.6 ug/m^3 for the eastern United States and 4.5 ug/m^3 for the western United States. For PM2.5, estimates were 3.3 ug/m^3 in the east and 1.5 ug/m^3 in the west.

The United States Environmental Protection Agency (US EPA) published estimates of background particulate matter in their Criteria Document for Particulate Matter (EPA, 1996). This document provides regional background PM concentrations for annual or longer averaging times. The range of background PM10 concentrations was cited at 5-11 ug/m^3 for the eastern United States and 4-8 ug/m^3 for the western United States. The lower bounds of the estimates are based on analyses of natural trace species as determined by Trijonis et al. (1990). The upper bounds were derived from multi-year annual averages of the clean remote monitoring sites in the IMPROVE network and reflect the effects of both natural and anthropogenic PM and precursor emissions from within North America (Malm et al., 1994). Corresponding PM2.5 levels were estimated to range between 2-5 ug/m^3 in the eastern United States and from 1-4 ug/m^3 in the western United States (EPA, 1996).

The Canadian Federal-Provincial Working Group on Air Quality Objectives and Guidelines derived estimates of background levels for both PM10 and PM2.5 for the purpose of determining benefits associated with emission reductions (CEPA, 1999). The selection of these value was based on estimates of natural PM concentrations in the United States (Trijonis et al., 1990), estimates of background levels by the US EPA (EPA, 1996) and an analysis of PM levels between 1988-1994 at three rural sites in eastern Canada. The latter analysis was based on identification of “clean days” as determined by using the 10^{th} percentile concentrations. Based on these sources, the natural non-anthropogenic annual average background concentration of PM10 was estimated at 5 ug/m^3 and that for PM2.5 at 2.5 ug/m^3. The background level for PM2.5 was based on monitoring data indicating that PM2.5 comprises approximately half the mass of PM10 (CEPA, 1998).

Most air quality stations within the Canadian and US air quality networks are influenced to a degree by non-local sources of particulate matter, whether they are of natural or anthropogenic origin. Even stations located in “pristine” natural areas are influenced to some extent by natural events (e.g. forest fires, resuspension of geological dust, volcanic eruptions), short range transport from upwind source areas and long range intercontinental transport (e.g trans Pacific dust storms). In the case of intercontinental transport of desert dust, the rise in PM levels can be

quite dramatic. For example, during the 1998 trans Pacific Asian Dust event, data from several air quality networks indicated that the concentration of PM10 averaged over 150 stations in Washington, Oregon, California, Nevada and Oregon was 65 ug/m^3 between April 26-May 1, 1998 compared to about 20 ug/m^3 during the rest of April and May. Moreover, during the event, PM10 concentrations exceeded 100 ug/m^3 in central British Columbia, Washington State and Oregon (EPA, 2002). The highest hourly observed concentration was measured at Chilliwack Airport on April 29, 1998: 120 ug/m^3 for PM10 and 44 ug/m^3 for PM2.5 (MWLAP, 2002). In the case of PM2.5, concentrations have been shown to increase by 8.7± 2.3 ug/m^3 during dust events, with mean maximum dust contributions of 19.7± 8.4 ug/m^3 (EPA, 2002).

Because natural PM events can result in very high hourly and daily average concentrations, short term values should be evaluated with caution when assessing PM levels for a given area. To avoid the confounding effect of short term natural episodes, health and environment agencies have derived particulate matter background values based on annual or longer averaging times.

Purpose

This document examines particulate matter measurements from the Canadian National Air Pollutant Surveillance Network from 1996-2001 and compares them with published background levels for Canada and the United States. Data are discussed in the context of current Canadian air quality standards, objectives and health reference levels and their application to airshed management.

Data

The National Air Pollutant Surveillance Network (NAPS) is a federal/provincial/municipal cooperative program that compiles data from all government monitoring programs across Canada (NAPS, 2001). The network monitors atmospheric pollutants at stations located in mostly urban and semi rural locations. Continuous particulate matter data are generated from Rupprecht & Patashnick (R&P) Tapered Element Oscillating Microbalance (TEOM) monitors and meet the performance criteria required for designation as a US EPA Federal Equivalent Method Sampler. Using this method, particulate matter has been monitored on an hourly basis at 89 sites across Canada since 1996. NAPS data are validated using automated and manual procedures and submitted to tests outlined by the US EPA prior to entry in to the NAPS database. Summary statistics for 1 hour and 24 hour PM10 and PM2.5 data from 1996-2001 are presented in Appendix tables A1-A4.

PM10 Concentrations and Background Levels

Table 1 presents a statistical summary for 1 hour PM10 concentrations measured at Canadian air quality stations in the NAPS network. Published background concentrations for Canada and the United States are shown for comparison to annual means. The 10^{th} and 30^{th} percentile levels are shown as an indication of concentrations at the lower end of the statistical distribution. The 10^{th} percentile concentrations represent the “cleanest days” and give an indication of the highest potential for improvement. For the purpose of this document, western Canada is defined as lying westward of the Ontario-Manitoba border.

Annual mean PM10 concentrations for eastern Canadian stations are well above background levels for Canada and the eastern United States (Table 1). At the 10^{th} percentile level, mean PM10 concentrations exceed the Canadian background level, but the range is within the background level for the eastern United States. At the 30^{th} percentile level, the upper range of the distribution exceeds background levels for both Canada and the eastern United States.

Table 1. Summary Statistics for Hourly PM10 Concentrations (ug/m^3) Measured at Canadian Air Quality Stations Between 1996-2001. Values are Averages with the Range Shown in Brackets.

Geographic Area	Stations	Background Conc.	Annual Mean	10th Percentile	30th Percentile
Canada East	15	5[1] 6.6[2] 5-11[3]	20(15-29)	6.3(3-9)	11(7-16)
Canada West	61	5[1] 4.5[4] 4-8[5]	15(6-29)	4.3(2-8)	7(3-14)

[1]CEPA, 1999 - Canada
[2]Trijonis et al., 1990 - eastern US
[3] EPA, 1996 - eastern US
[4]Trijonis et al., 1990 - western US
[5] EPA, 1996 - western US

For western Canadian stations, the average of the annual mean is above background levels, however, the lower range of the mean is within the range of background levels for the western United States (Table 1). This indicates that, in contrast to eastern Canada, some western Canadian stations are minimally influenced by anthropogenic influences.

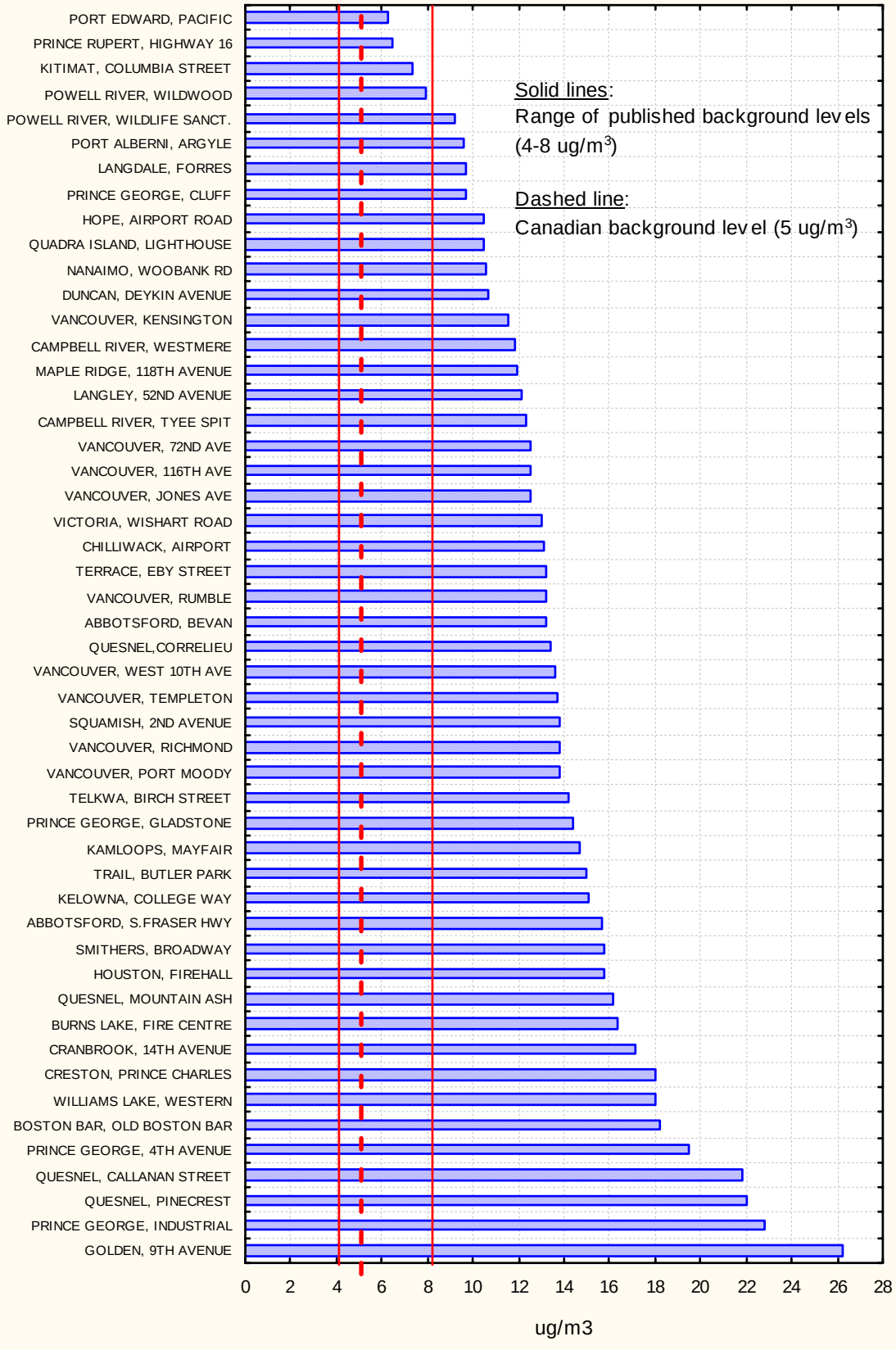
Table 2 identifies the western Canadian stations with annual means falling within the range of background levels for Canada and the western United States (4-8 ug/m^3). Of these five stations, four are located in British Columbia and one in Alberta. All four British Columbia stations are located in the vicinity of northern cities situated in well ventilated coastal locations receiving relatively high levels of precipitation, while the station in Alberta (Hightower Ridge) is a high elevation station located in the foothills of the Rocky Mountains. It should be noted that at the 10th percentile level, concentrations at Canadian stations range between 2-9 ug/m^3, a level similar to that reported for western US background sites in the IMPROVE network (range 2-8.8 ug/m^3, Malm, 2000).

Figure 1 presents the PM10 annual average for NAPS stations in British Columbia and compares them to the range of published background levels for Canada and the western United States. For ease of comparison, stations were arranged in increasing order from lowest to highest concentration. According to Figure 1, four of the 50 stations monitoring PM10 had annual averages within the range of background levels. These are located at Port Edward, Prince Rupert, Kitimat and Powell River. Four additional stations, located at Powell River, Port Alberni, Langdale and Prince George, have annual averages near background levels (<10 ug/m^3). Note that the Prince George Cluff station is located on the northern edge of Prince George and is not representative of urban conditions in the area. As the remainder of the stations, twenty-seven have annual averages between 10-15 ug/m^3, eleven have annual averages between 15-20 ug/m^3 and four have annual averages above 20 ug/m^3. All stations in Vancouver and the Lower Fraser Valley have annual averages in the range of 10-16 ug/m^3. Golden, Prince George and Quesnel have the highest PM10 levels in the province.

Table 2. Summary Statistics for Western Canadian Stations with PM10 Annual Averages in the Range of Background Levels for Canada and Western United States (4-8 ug/m^3).

STATION	CITY	LOCATION	START	END	MIN	10	30	50	70	80	90	95	98	99	100	MAX	Annual Mean
91201	HIGHTOWER RIDGE, AB	SE 11 54 2 W6	6/1/1999	12/31/2001	0	3	4	5	6	8	10	12	16	19	31	59	6
104401	PORT EDWARD BC	770 PACIFIC STREET	1/1/1999	12/31/2001	0	2	3	5	7	9	12	16	23	29	58	114	6
104701	PRINCE RUPERT, BC	HIGHWAY 16	1/1/1999	12/31/2001	0	2	3	5	7	9	13	17	24	30	54	131	6
103901	KITIMAT, BC	653 COLUMBIA STREET	8/11/1998	12/31/2001	0	2	4	6	8	10	14	18	24	30	56	117	7
102302	POWELL RIVER, BC	WILDWOOD MOTORS	1/1/2001	12/31/2001	0	3	5	7	9	11	14	17	22	26	43	134	8

Figure 1. PM10 Annual Means for BC NAPS Stations



PM2.5 Concentrations and Background Levels

Table 3 presents summary statistics for hourly PM2.5 concentrations for Canadian NAPS stations and compares them to published background concentrations for Canada and the United States.

Table 3. Summary Statistics for Hourly PM2.5 Concentrations (ug/m^3) at Canadian Air Quality Stations Between 1996-2001. Values are Averages with the Range Shown in Brackets.

Geographic Area	Stations	Background Concs.	Annual Mean	10th Percentile	30th Percentile
Canada East	38	2.5[1] 3.3[2] 2-5[3]	8.1(4-18)	0.7(0-2)	2.9(1-5)
Canada West	26	2.5[1] 1.5[4] 1-4[5]	5(1-9)	0.2(0-1)	2.0(0-4)

[1]CEPA, 1999 - Canada
[2]Trijonis et al., 1990 - eastern US
[3] EPA, 1996 - eastern US
[4]Trijonis et al., 1990 - western US
[5] EPA, 1996 - western US

The average of the annual mean for eastern Canada is well above the Canadian background level (Table 3), however the lower range of the distribution falls within the range of background concentrations for the eastern United States. At the 10th percentile level, concentrations in eastern Canada are uniformly below background, however at the 30th percentile level, concentrations begin to reach the upper range of background as defined by the US EPA. Table 4 identifies eastern Canadian stations with PM2.5 annual means within the range of background levels for Canada and the eastern United States (2-5 ug/m^3). Six of the seven stations listed in Table 4 are located in maritime provinces and one station is located in Quebec. All stations in Ontario exceeded background levels.

For western Canada, the average of the annual mean is above background levels, but the lower range of the distribution is within background levels for Canada and western United States (Table 3). The 10th percentile concentrations are below background levels for both Canada and the United States. For comparison, at western US background sites in the IMPROVE network, the 10th percentile PM2.5 concentration spans between 0.59-3.5 ug/m^3 (Malm, 2002), a range higher than that at the cleanest Canadian NAPS stations (0-2 ug/m^3).

Table 5 identifies western Canadian stations with PM2.5 annual means within the range of background concentrations for Canada and the western United States (1-4 ug/m^3). Two of the seven stations in Table 5 are located in British Columbia and five in Alberta. All stations in Alberta are located in rural or semi-rural locations. Both stations in British Columbia are located near well-ventilated urban centers in coastal areas receiving relatively high levels of precipitation. Figure 2 shows the annual average PM2.5 concentration for the fourteen stations monitoring hourly PM2.5 in British Columbia. Two of the stations, Powell River, Wildlife, and Victoria, Sooke Rd., fall within the range of background levels for Canada and western United States. Six additional stations, located in Nanaimo, Victoria, Quesnel, Kamloops, Chilliwack and Kelowna, have concentrations within 2 ug/m^3 of background levels. Prince George has the highest PM 2.5 annual concentration at 9.2 ug/m^3. It should be noted, however, that the PM2.5 analyzer at Prince George is of an older version and tends to record lower levels than the newer sharp-cut heads (Dennis Fudge, WLAP, pers. comm.).

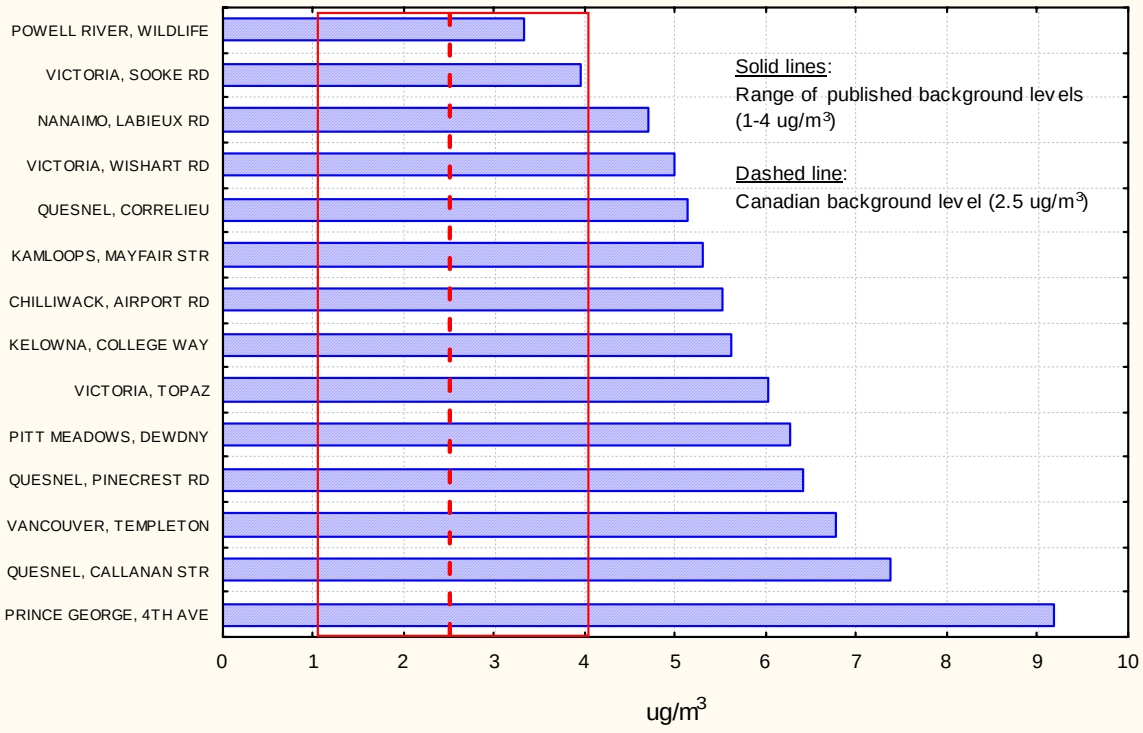
Table 4. Summary Statistics for Eastern Canadian Stations with 1 Hour PM2.5 Annual Averages Within the Range Background Levels for Canada and the Eastern United States (2-5 ug/m^3)

STATION	CITY	LOCATION	START	END	MIN	10	30	50	70	80	90	95	98	99	MAX	ANNUAL MEAN
40901	ST. ANDREWS, NB	HUNTSMAN MARINE	5/1/1998	12/31/2001	0	0	1	3	4	6	9	12	17	22	92	4
41301	BATHURST, NB	430 ST. PETERS AVE	1/1/2000	12/31/2001	0	0	1	3	5	6	9	12	17	21	59	4
30501	KEJIMKUJIK, NS	NATIONAL PARK	1/1/1998	12/31/2001	0	0	1	3	5	6	10	14	20	23	175	4
40302	MONCTON, NB	5 THANET STREET	10/1/1999	12/31/2001	0	0	1	3	5	7	10	14	20	25	88	4
55301	L'ACADIE, QUE	1134 ROUTE 219	11/1/1999	12/31/2001	0	0	1	3	6	8	13	17	23	27	60	5
10102	ST. JOHN'S, NF	354 WATER STREET	1/1/1998	12/31/2001	0	1	3	4	6	8	10	13	17	21	219	5
40103	FREDERICTON, NB	ABERDEEN STREET	4/1/1999	12/31/2001	0	0	2	4	6	9	13	17	23	27	81	5

Table 5. Summary Statistics for Western Canadian Stations with 1 Hour PM2.5 Annual Averages Within the Range of Background Levels for Canada and the Western United States (1-4 ug/m^3)

STATION	CITY	LOCATION	START	END	MIN	10	30	50	70	80	90	95	98	99	MAX	ANNUAL MEAN
91201	HIGHTOWER RIDGE, AB	SE 11 54 2 W6	5/1/2000	12/31/2001	0	0	0	0	0	1	2	4	6	9	49	1
91801	FORT CHIPEWYAN, AB	FORT CHIPEWYAN	1/1/2001	12/31/2001	0	0	0	1	2	3	4	5	7	8	53	2
91301	TOMAHAWK, AB	SE 2 51 6 W5	5/1/2000	12/31/2001	0	0	0	0	2	3	5	8	12	15	51	2
102301	POWELL RIVER, BC	WILDLIFE SANCTUARY	9/20/1998	12/31/2001	0	0	1	2	4	5	8	11	15	18	124	3
90702	FORT MCMURRAY, AB	TIMBERLEA SUBDIVISION	1/1/1999	12/31/2001	0	0	1	2	4	6	8	11	16	21	172	4
100307	VICTORIA, BC	2005 SOOKE ROAD	1/1/2001	12/31/2001	0	0	2	3	5	6	8	10	13	16	43	4
90801	FORT MACKAY, AB	MAIN STREET	1/1/1999	12/31/2001	0	0	1	3	5	7	10	13	17	20	102	4

Figure 2. PM2.5 Annual Means for BC NAPS Stations



Summary

Studies have shown that ambient concentrations of particulate matter in Canadian cities are at levels that are of concern to human health. Since a threshold level for health effects does not exist for exposure to particulate matter, existing air quality standards and objectives cannot be viewed as final air quality targets. Rather, they are best viewed as indicators to identify priority airsheds for management plans aimed at emission reductions. Canadian Health Reference Levels, indicate the level above which effects on human health can be demonstrated with statistical confidence. However these cannot be considered safe concentrations, as health effects do occur at concentrations below these levels. In view of this fact, the WGAQOG has suggested that background levels be used as targets for reduction of ambient particulate matter.

Background levels of particulate matter have been estimated by regulatory agencies in both Canada and the United States. For PM10, the US EPA estimates a background level of 5-11 ug/m^3 for the eastern United States and 4-8 ug/m^3 for the western United States. For PM2.5, these levels are 2-5 ug/m^3 for the eastern United States and 1-4 ug/m^3 for the western United States. Background concentrations estimated by the Canadian regulatory agencies are largely based on US values and are not regionally specific. These are estimated at 5 ug/m^3 for PM10 and 2.5 ug/m^3 for PM2.5.

Annual average PM10 concentrations in eastern Canada exceeded both Canadian and US background levels at all stations. In western Canada, however, five stations were within published background levels. These stations are located in rural or semi-rural locations or in well ventilated coastal city locations receiving relatively high levels of precipitation. In British Columbia, four out of 50 stations with hourly PM10 monitors had concentrations within the range of published background levels for Canada and the United States. Most stations in British Columbia have PM10 annual averages within 10 ug/m^3 of the Canadian background level and within 7 ug/m^3 of the upper range of background levels for the western United States.

In the case of PM2.5, seven stations in eastern Canada had concentrations within the range of background levels. All but one station were located in maritime provinces. In western Canada, seven stations were in the range of background levels. In British Columbia, two of the fourteen stations with hourly PM2.5 monitors were within this range, and both are located in coastal cities. Most stations in British Columbia have annual averages within 4 ug/m^3 of the Canadian background level and within 3 ug/m^3 of the upper range of background levels for the western United States.

Conclusions

While a number of NAPS stations across western Canada have particulate matter concentrations in the range of background levels, the question remains as to whether currently published Canadian and US background values are representative of true background conditions in Canada. While background levels derived by the EPA were determined based on assessments of natural trace species and extensive monitoring at background sites within the United States, Canadian levels were for the most part adopted from US studies and relied on an assessment of a very limited number of rural sites, all located in eastern Canada. The validity of applying background values based largely on US assessments is questionable in view of the fact that at the lowest part of the distribution, PM2.5 concentrations at the cleanest Canadian stations in the NAPS network are lower than those at US background sites. Another problematic issue is the application of a single background concentration for both eastern and western Canadian stations. The lack of regionally specific background estimates stems from the historical paucity of PM data from background sites in western Canada. However, recent enhancements to the CAPMoN monitoring network enabling collection of PM data in rural locations should fill that gap in the future.

In spite of some of the low PM concentrations reported for a small number of NAPS stations, the analysis presented in this document indicates that most Canadian airsheds are above currently published background levels for both PM10 and PM2.5. In view of the strong evidence for health effects associated with ambient levels of particulate matter, regulatory agencies are seeking to reduce ambient levels of particulate matter even further. Although background levels have been suggested as ideal targets for reduction, the data indicate that for many Canadian communities this target will be difficult to achieve in the near future, especially in areas with large urban centers, or those affected by transboundary pollution. As an alternative to using broadly derived background levels as targets, interim targets could be developed based on local background concentrations for specific airsheds. This could be achieved though the application of trajectory analysis for the purpose of identifying the range of PM concentrations for “clean days”, defined as those days when arriving air masses originate from unpolluted areas. In this manner, airshed specific background concentrations could be used as interim targets for emission reductions. For airsheds with annual concentrations within a few ug/m^3 of background levels, background concentrations can be considered reasonable targets for emission reductions.

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Appendix

Summary Statistics for NAPS Stations Monitoring Hourly PM10 and PM2.5

Table A1. PM10 1 Hour Summary Statistics (µg/m³)

STATION	C/R/I	CITY	LOCATION	START	END	ID	MIN	10	30	50	70	80	90	95	98	99	99.9	MAX	DAYS OF DATA	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL MEAN	STD. DEV.
40203	R	SAINT JOHN	FOREST HILLS	1/1/1996	6/30/2001	1 HR	0	4	8	12	18	24	33	41	53	63	90	163	1376	13	15	14	15	19	20	18	18	16	15	10	13	16	13
50109	C	MONTRÉAL	2495 RUE DUNCAN	1/1/1996	9/12/2000	1 HR	0	9	16	23	34	42	56	73	96	119	208	372	1227	27	43	37	26	30	27	29	30	29	22	23	27	29	24
50110	C	MONTRÉAL	11280 BOUL. PIE IX	1/1/1996	12/31/2000	1 HR	0	7	12	18	26	33	45	59	82	101	169	283	1082	21	37	30	23	25	23	20	22	21	20	19	21	23	20
50308	I	QUÉBEC	600 RUE DES SABLES	1/1/1998	4/7/1998	1 HR	0	5	8	12	20	26	37	50	66	84	138	260	90	13	23	19	---	---	---	---	---	---	---	---	---	---	---	---
60211	R	WINDSOR	COLLEGE & SOUTH ST.	1/1/1996	12/31/2001	1 HR	0	9	15	21	29	36	48	59	75	89	187	349	2077	21	21	22	23	28	32	31	29	31	28	23	20	26	19
60302	R	KINGSTON	133 DALTON AVENUE	1/1/1996	12/31/1999	1 HR	0	3	8	14	22	29	43	56	77	98	187	486	1154	12	16	22	25	24	22	21	18	21	22	16	12	19	21
60403	I	TORONTO	EVANS & ARNOLD AVE.	1/22/1997	2/13/2001	1 HR	0	8	14	19	26	32	41	50	63	72	103	194	1007	22	24	22	23	25	26	24	22	23	21	17	18	22	15
60410	R	TORONTO	LAWRENCE & KENNEDY	11/22/1996	12/31/2001	1 HR	0	7	11	16	22	27	36	45	56	64	98	179	1749	17	19	17	18	20	23	22	23	22	19	16	16	19	13
60413	R	TORONTO	ELMCREST ROAD	1/1/1999	12/31/2001	1 HR	0	7	11	16	23	28	37	47	58	67	94	156	960	16	17	15	18	16	23	25	23	24	22	19	18	19	13
60425	C	TORONTO	QUEEN & UNIVERSITY	11/18/1996	12/31/1996	1 HR	2	9	13	16	21	23	28	32	39	40	53	55	43	---	---	---	---	---	---	---	---	---	---	---	---	18	---	
60429	R	TORONTO	JUDSON ST. & ETONA CT.	2/27/2001	12/31/2001	1 HR	0	8	13	19	27	34	46	57	69	80	124	180	299	---	---	19	21	27	32	24	27	22	24	22	17	---		
60430	C	TORONTO	125 RESOURCES ROAD	1/1/2000	12/31/2000	1 HR	0	4	10	14	21	26	35	42	54	61	92	187	335	18	20	17	14	15	17	17	19	19	21	16	16	17	13
60501	C	HAMILTON	BARTON & WENTWORTH	7/1/1998	5/20/1999	1 HR	1	5	13	20	29	36	47	59	78	96	264	322	97	---	22	18	24	36	---	---	---	---	---	---	---	---	---	
60512	C	HAMILTON	ELGIN & KELLY	1/1/1996	12/31/1998	1 HR	0	8	13	18	25	32	45	60	81	99	163	981	711	21	21	26	24	30	37	20	23	20	24	16	17	23	20
60518	I	HAMILTON	HOMESIDE II	3/1/2000	5/31/2000	1 HR	2	10	17	23	33	40	51	62	89	102	182	221	85	---	---	30	27	28	---	---	---	---	---	---	---	---	---	
60519	I	HAMILTON	NIAGARA & LAND STREET	1/19/2000	12/31/2000	1 HR	0	6	14	22	34	44	61	82	108	129	199	262	311	---	---	30	33	36	33	34	33	27	31	25	12	---		
60707	I	SAULT STE. MARIE	331 PATRICK ST.	1/1/1996	12/31/2001	1 HR	0	4	7	12	19	25	38	53	78	98	181	359	2042	13	15	22	25	21	22	17	18	19	16	14	13	18	20
60807	R	THUNDER BAY	615 JAMES STREET SOUTH	1/1/2001	6/25/2001	1 HR	2	6	8	11	14	16	17	20	23	28	28	28	3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	
60903	C	LONDON	900 HIGHBURY AVENUE	1/1/1996	12/28/2000	1 HR	0	6	11	16	23	29	39	49	61	70	108	248	1751	15	18	18	18	24	27	24	24	23	19	15	13	20	15
61004	R	SARNIA	FRONT ST. AT C.N. TRACKS	6/7/1996	12/31/2001	1 HR	0	5	10	15	22	29	39	48	60	68	106	360	1839	15	15	16	17	21	25	23	23	21	21	17	13	19	15
61104	R	PETERBOROUGH	10 HOSPITAL DRIVE	11/26/1998	2/27/2001	1 HR	0	5	8	12	17	22	31	38	48	56	87	182	800	13	17	17	13	18	18	18	16	17	15	13	11	15	12
63001	R	BURLINGTON	HWY 2 & NORTH SHORE BLVD.	3/11/1999	4/25/2001	1 HR	0	6	11	15	21	26	34	41	51	58	80	141	694	16	17	15	15	20	21	23	19	22	19	15	16	18	12
63201	R	STOUFFVILLE	HWY 47 & HWY 48	1/1/1999	5/2/2001	1 HR	0	6	9	13	19	24	34	42	54	63	120	192	840	13	15	16	16	22	20	21	19	20	18	14	13	17	13
70118	R	WINNIPEG	JEFFERSON & SCOTIA	3/1/1995	7/31/1999	1 HR	0	5	9	13	20	26	36	48	66	85	148	217	601	12	13	14	20	24	25	20	25	17	18	12	11	18	17
70119	C	WINNIPEG	65 ELLEN STREET	1/1/1995	12/31/2001	1 HR	0	7	11	16	24	30	42	53	70	85	158	433	2123	13	18	22	32	26	21	23	27	23	20	15	13	21	18
70203	R	BRANDON	1430 VICTORIA AVENUE EAST	10/7/1997	12/31/2001	1 HR	0	4	8	13	22	30	46	66	98	131	307	498	1416	10	11	18	18	34	25	20	23	35	31	26	15	11	21	27
80110	C	REGINA	2505 11TH. AVENUE	1/1/1999	12/31/2001	1 HR	0	7	13	21	33	43	63	85	113	136	230	358	690	13	17	27	34	40	26	30	44	41	34	30	18	29	28
90121	I	EDMONTON	17 STREET & 105 AVENUE	4/1/1998	12/31/2000	1 HR	0	5	10	15	24	32	46	63	89	116	228	395	860	14	19	19	27	24	20	22	27	28	28	18	15	22	24
90122	R	EDMONTON	13335 127 ST	1/1/1995	12/31/2001	1 HR	0	7	12	18	26	33	46	60	81	99	200	731	2092	19	24	25	26	26	20	20	29	27	24	23	20	24	21
90227	C	CALGARY	611-4TH STREET S.W.	4/1/1995	12/31/2001	1 HR	0	8	14	20	29	36	49	63	84	101	179	596	2126	25	34	27	26	27	21	24	30	27	23	23	21	26	21
90302	R	RED DEER	73 STREET & RIVERSIDE DRIVE	1/1/2000	12/31/2000	1 HR	0	5	9	14	22	28	41	54	73	94	170	382	362	12	18	22	18	19	16	18	21	26	27	26	13	20	19
91201	F	HIGHTOWER RIDGE	SE 11 54 2 W6	6/1/1999	12/31/2001	1 HR	0	3	4	5	6	8	10	12	16	19	31	59	893	5	5	5	7	6	6	7	8	5	5	5	4	6	4
91301	A	TOMAHAWK	SE 2 51 6 W5	5/1/2000	12/31/2001	1 HR	0	4	6	9	13	16	23	31	42	51	83	197	428	---	---	---	---	6	10	12	18	13	12	10	9	---	
91701	F	STEEPER	NE 12 48 22 W5	5/1/2000	12/31/2001	1 HR	0	3	5	6	9	12	18	26	47	70	154	198	574	7	7	5	7	9	10	15	18	12	7	7	6	10	13
100110	R	VANCOUVER	6400 E. HASTINGS & KENSINGTON	1/1/1995	12/31/2001	1 HR	0	4	7	10	13	16	21	26	33	39	60	148	2142	9	9	9	11	12	12	15	15	15	12	10	9	12	8
100111	I	VANCOUVER	MOODY & ESPLANADE PORT MOODY	1/1/1995	12/31/2001	1 HR	0	5	9	12	16	20	25	30	38	43	64	110	2119	12	12	11	13	14	14	18	18	18	14	12	11	14	9
100118	R	VANCOUVER	2550 WEST 10TH AVENUE	1/1/1995	12/31/2001	1 HR	0	6	9	12	16	19	24	29	36	42	75	180	2185	13	13	12	13	13	13	15	15	15	15	14	13	14	9
100119	R	VANCOUVER	5455 RUMBLE STREET	1/1/1995	12/31/2001	1 HR	0	5	8	11	15	18	24	30	39	46	71	103	2185	11	12	11	13	13	13	16	17	16	14	13	11	13	9
100125	R	VANCOUVER	8544 116TH AVE. DELTA	1/1/1995	1/31/2000	1 HR	0	4	7	10	15	18	23	29	37	43	69	138	1440	10	11	10	12	13	12	16	16	17	14	11	9	13	9
100127	R	VANCOUVER	19000 & 72ND AVE. SURREY	1/1/1995	12/31/2001	1 HR	0	5	8	11	15	17	22	27	34	40	67	109	2161	10	11	11	13	13	12	15	15	15	14	12	9	12	8
100128	R	VANCOUVER	WILLIAMS & ARAGON RICHMOND	1/1/1995	12/31/2001	1 HR	0	5	9	12	16	19	24	31	40	49	98	270	2168	13	14	12	14	13	12	14	16	15	16	15	13	14	10
100132	R	VANCOUVER	16TH ST. & JONES AVE NORTH VAN	4/1/2000	12/31/2001	1 HR	0	4	8	11	15	18	24	29	35	40	55	87	575	11	10	10	12	13	12	14	15	15	12	12	11	13	8
100134	R	VANCOUVER	3153 TEMPLETON STREET	2/1/1998	12/31/2001	1 HR	0	5	9	12	16	19	24	30	38	45	76	140	1411	13	12	11	14	13	13	14	15	16	15	14	12	14	9
100202	C	PRINCE GEORGE	1011 4TH AVENUE	1/1/1995	12/31/2001	1 HR	0	4	9	14	21	28	41	55	76	94	175	373	2148	17	25	26	23	18	15	18	19	21	19	17	17	19	19
100203	C	PRINCE GEORGE	1108 INDUSTRIAL WAY	9/28/1996	12/31/2001	1 HR	0	4	10	16	26	33	48	64	91	116	228	582	1912	20	25	23	32	25	18	20	25	26	21	20	20	23	24
100205	R	PRINCE GEORGE	GLADSTONE SCHOOL	1/1/1998	12/31/2000	1 HR	0	3	6	10	16	22	31	41	56	68	116	207	1079	15	16	18	16	14	12	12	13	15	15	14	13	14	14
100209	R	PRINCE GEORGE	7310 CLUFF	1/1/1999	2/14/2001	1 HR	0	3	5	7	11	13	19	25	35	44	85	221	769	10	9	10	9	8	9	9	9	11	11	11	10	10	9
100308	C	VICTORIA	3300 WISHART ROAD	1/3/2001	12/31/2001	1 HR	0	5	8	11	14	17	23	30	41	54	126	286	354	12	12	12	14	13	11	14	13	17	14	14	10	13	11
100402	C	KAMLOOPS	MAYFAIR STREET	1/1/1995	12/31/2001	1 HR	0	5	8	11	16	19	25	33	47	67	246	699	2171	13	17	18	17	13	12	13	16	15	14	13	13	15	18
100701	C	KELOWNA	3333 COLLEGE WAY	1/1/1995	12/31/2001	1 HR	0	5	8	12	17	21	28	36	49	60	102	203	2174	13	21	20	16	13	11	13	17	16	15	15	11	15	12
101002	R	ABBOTSFORD	33660 SOUTH FRASER HIGHWAY	1/1/1995	9/17/1998	1 HR	0	5	9	13	18	22	29	36	49	60	142	342	898	12	16	12	15	16	15	20	21	20	16	14	11	16	13
101003	R	ABBOTSFORD	32995 BEVAN AVE.	9/18/1998	12/31/2001	1 HR	0	5	8	11	15	19	24	30	37	43	87	213	1165	11	11	10	14	13	12	16	16	18	15	12	11	13	9
101101	R	CHILLIWACK	46244 AIRPORT ROAD	1/1/1995	12/31/2001	1 HR	0	5	8	11	15	18	25	31	40	49	92	184	2115	11	11	10	13	14	13	18	19	17	13	10	10	13	10
101202	R	PITT MEADOWS	18477 DEWDNY TRUNK	7/1/2001	12/31/2001	1 HR	0	4	7	11	15	18	23	29	34	38	50	51	160	---	---	---	---	---	---	---	15	15	12	10	9	---	
101301	U	LANGLEY	23752 52ND AVENUE	1/1/1995	12/31/2001	1 HR	0	5	8	10	14	17	22	27	34	39	67	115	2099	9	10	10	14	12	12	15	15	15	15	11	9	12	8
101401	U	HOPE	62715 AIRPORT ROAD	12/1/1996	12/31/2001	1 HR	0	4	6	9	12	15	19	24	31	37	58	132	1832	7	8	8	11	12	11	15	16	13	10	9	7	10	7
101501	R	MAPLE RIDGE	23124 118TH AVENUE	2/1/1998	8/31/2001	1 HR	0	4	7	10	14	17	22	27	33	39	63	116	1215	9	9	9	13	12	12	15	16	16	13	10	9	12	8
101601	R	SQUAMISH	38075 2ND AVENUE	1/1/1998	12/31/2001	1 HR	0	3	7	11	16	20	28	35	46	54	84	138	1400	9	10	10	14	15	15	20	19	18	15	11	9	14	11
101701	R	QUESNEL	585 CALLANAN STREET	1/1/1995	12/31/2001	1 HR	0	5	10	15	23	30	44	60	89	118	261	583	2168	15	32	37	24	19	16	19	22	20	20	22	15	22	24
101702	R	QUESNEL	950 MOUNTAIN ASH ROAD	5/24/1995	12/31/2001	1 HR	0	4	7	12	18	24	34	45	62	78	157	318	2140	14	22	21	17	15	13	15	17	16	14	16	12	16	16
101703	R	QUESNEL	501 PINECREST ROAD	6/9/1995	12/31/2001	1 HR	0	5	9	14	23	31	48	67	96	120	222	514	2112	14	25	29	27	22	20	19	24	22	24	23	15	22	24
101704	R	QUESNEL	CORRELIEU SCHOOL	1/1/2001	12/31/2001	1 HR	0	3	6	10	15	19	28	37	52	63	108	175	365	12	17	16	13	12	10	12	20	14	11	15	11	13	13
101801	R	CRESTON	PRINCE CHARLES SECONDARY SCHOOL	1/1/1995	12/31/2000	1 HR	0	4	8	13	19	25	36	50	77	100	177	349	1468	16	28	22	16	15	14	17	21	16	19	16	14	18	19
101901	R	CRANBROOK	ADJACENT TO 1333 14TH AVENUE S	1/1/1995	11/29/1998	1 HR	0	4	8	12	18	23	35	49	76	104	201	336	1032	17	29	24	19	17	14	14	17	15	14	15	12	17	20
102102	R	NANAIMO	280 LABIEUX ROAD	1/27/1998	9/27/1998	1 HR	0	5	8	11	15	17	23	30	43	52	94	186	240	---	10	11	16	18	13	15	13	13	---	---	---	---	---	
102103	R	NANAIMO	CEDAR 7 WOODBANK RD	4/1/2000	12/31/2001	1 HR	0	4	6	9	12	15	19	24	31	37	85	121	622	9	12	10	11	10	9	11	11	11	11	12	9	11	8
102201	R	TRAIL	BUTLER PARK	1/1/1995	5/8/2000	1 HR	0	5	9	12	17	20	27	35	48	61	127	319	1225	12	17	16	16	14	13	16	19	16	17	13	11	15	12
102301	R	POWELL RIVER	WILDLIFE SANCTUARY	1/1/1998	12/31/2001	1 HR	0	3	5	7	10	13	18	23	32	40	74	184	1422	6	7	8	10	10	10	12	12	12	10	8	6	9	8
102302	C	POWELL RIVER	WILDWOOD MOTORS	1/1/2001	12/31/2001	1 HR	0	3	5	7	9	11	14	17	22	26	43	134	363	6	8	8	10	9	8	9	10	9	7	7	6	8	5
102401	R	SMITHERS	4020 BROADWAY AVENUE	10/1/1997	12/31/2001	1 HR	0	4	8	11	17	22	31	42	62	80	159	608	1525	14	20	27	20	13	12	13	13	14	15	16	13	16	17
102501	R	TERRACE	104 - 3220 EBY STREET	11/1/1997	12/31/2001	1 HR	0	3	6	9	14	18	27	38	56	74	137	255	1507	10	16	21	18	13	13	14	13	15	11	10	8	13	14
102601	R	PORT ALBERNI	5410 ARGYLE STREET	9/16/1997	12/31/2001	1 HR	0	3	6	8	11	14	18	23	30	36	61	147	1514	8	9	8	11	9	7	9	9	11	11	11	9	10	7
102701	R	WILLIAMS LAKE	1045 WESTERN AVENUE	1/1/1995	12/31/2001	1 HR	0	4	9	13	20	26	36	48	68	86	176	496	2060	15	21	21	20	17	15	16	20	20	17	19	15	18	18
102702	R	WILLIAMS LAKE	SKYLINE SCHOOL	8/8/2001	12/31/2001	1 HR	0	4	9	16	28	41	69	105	150	209	383	458	145	---	---	---	---	---	---	---	50	32	26	30	13	---	
102801	R	CAMPBELL RIVER	ADJACENT TO 660 WESTMERE	12/8/1995	12/31/2001	1 HR	0	4	7	10	14	16	21	27	36	42	64	99	1922	11	12	11	12	11	10	13	13	12	13	13	11	12	8
102802	R	CAMPBELL RIVER	2662 TYEE SPIT ROAD	1/1/1998	12/31/2001	1 HR	0	4	7	10	14	17	23	30	42	52	93	214	1448	9	10	10	13	13	12	16	17	14	12	11	9	12	10
103202	R	GOLDEN	835 9TH AVENUE SOUTH	2/11/1999	12/31/2001	1 HR	0	6	12	18	28	36	52	74	112	152	308	428	839	18	27	57	27	19	18	18	22	22	24	27	19	26	29
103901	R	KITIMAT	653 COLUMBIA STREET	8/11/1998	12/31/2001	1 HR	0	2	4	6	8	10	14	18	24	30	56	117	1235	6	7	6	8	7	9	10	9	9	7	6	5	7	6
104401	R	PORT EDWARD	770 PACIFIC STREET	1/1/1999	12/31/2001	1 HR	0	2	3	5	7	9	12	16	23	29	58	114	1011	5	5	5	6	7	8	9	8	7	6	5	5	6	6
104501	R	QUADRA ISLAND	LIGHTHOUSE ROAD	1/1/1999	12/31/2001	1 HR	0	4	7	9	12	15	18	22	28	34	69	175	1074	8	10	10	11	10	10	11	13	12	12	12	8	10	7
104601	R	TELKWA	1304 BIRCH STREET	1/2/1999	12/31/2001	1 HR	0	3	6	10	15	20	29	40	62	83	181	452	1016	13	13	12	16	12	14	13	16	19	15	14	12	14	17
104701	R	PRINCE RUPERT	HIGHWAY 16	1/1/1999	12/31/2001	1 HR	0	2	3	5	7	9	13	17	24	30	54	131	1021	5	6	6	7	6	8	9	8	7	5	5	5	6	6
104801	R	DUNCAN	6364 DEYKIN AVENUE	1/1/1999	12/31/2001	1 HR	0	4	7	9	13	15	19	24	30	34	56	114	1080	11	11	10	11	9	8	10	10	11	12	14	11	11	7
105101	R	HOUSTON	FIREHALL	1/1/2000	12/31/2001	1 HR	0	4	7	11	17	22	32	44	63	81	152	291	684	12	16	28	18	12	14	13	15	15	15	16	12	16	16
105201	R	BURNS LAKE	FIRE CENTRE	1/1/2000	12/31/2001	1 HR	0	4	7	11	17	22	32	47	71	93	196	360	687	13	16	31	31	13	13	13	15	15	15	15	11	16	19
105301	R	LANGDALE	FORRES ROAD	1/9/2001	12/31/2001	1 HR	0	4	6	9	11	13	16	20	26	31	57	67	356	8	8	9	11	11	10	11	13	12	9	9	7	10	6
105401	R	BOSTON BAR	47864 OLD BOSTON BAR ROAD	1/1/2001	12/31/2001	1 HR	0	5	9	14	20	25	36	49	71	89	156	227	365	19	25	18	16	18	17	19	23	19	15	16	17	18	17
105501	C	FORT ST. JOHN	10015 100TH AVENUE	3/8/2001	12/31/2001	1 HR	0	5	8	13	22	30	42	55	73	90	160	257	283	---	---	25	27	24	20	18	25	19	17	12	9	---	
105601	R	OSOYOOS	6601 89TH STREET	8/1/2001	12/30/2001	1 HR	0	5	8	11	15	19	25	32	42	55	118	343	153	---	---	---	---	---	---	---	20	17	10	11	10	---	

Table A2. PM2.5 1 Hour Summary Statistics (µg/m³)

STATION	C/R/I	CITY	LOCATION	START	END	ID	MIN	10	30	50	70	80	90	95	98	99	99.9	MAX	DAYS	OF DAT	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL MEAN	STD. DEV.
10102	C	ST. JOHN'S	354 WATER STREET	1/1/1998	12/31/2001	1 HR	0	1	3	4	6	8	10	13	17	21	37	219	1339	6	5	6	5	5	4	5	6	5	5	6	5	5	5	
10301	C	CORNER BROOK	BROOK STREET	7/1/2001	12/31/2001	1 HR	0	0	2	4	6	8	12	16	26	31	49	81	169	---	---	---	---	---	---	---	6	7	6	5	4	4	---	
30120	R	DARTMOUTH	LAKE MAJOR ROAD	1/1/2001	12/31/2001	1 HR	0	2	6	9	14	18	26	36	52	62	92	108	193	---	---	---	---	---	---	---	14	19	8	13	10	8	---	
30310	C	SYDNEY	COUNTY JAIL	7/1/1998	12/31/2001	1 HR	0	1	3	4	7	9	12	15	20	24	39	54	505	6	5	7	5	6	6	6	7	6	5	5	5	6	5
30501	U	KEJIMKUJIK	NATIONAL PARK	1/1/1998	12/31/2001	1 HR	0	0	1	3	5	6	10	14	20	23	40	175	1102	3	3	3	3	4	6	7	7	5	4	4	3	4	5
40103	C	FREDERICTON	ABERDEEN STREET	4/1/1999	12/31/2001	1 HR	0	0	2	4	6	9	13	17	23	27	38	81	888	7	7	5	4	3	6	7	7	6	6	4	5	5	6
40203	R	SAINT JOHN	FOREST HILLS	11/1/1996	12/31/2001	1 HR	0	0	2		7	10	15	21	27	34	82	100	1056	5	6	5	5	7	8	7	11	7	8	4	5	7	8
40302	R	MONCTON	5 THANET STREET	10/1/1999	12/31/2001	1 HR	0	0	1	3	5	7	10	14	20	25	45	88	760	6	6	4	4	3	6	4	3	4	6	4	4	4	5
40901	U	ST. ANDREWS	HUNTSMAN MARINE RESIDENCI	5/1/1998	12/31/2001	1 HR	0	0	1	3	4	6	9	12	17	22	35	92	1260	3	4	3	4	4	5	5	5	3	4	3	3	4	4
41301	R	BATHURST	430 ST. PETERS AVENUE	1/1/2000	12/31/2001	1 HR	0	0	1	3	5	6	9	12	17	21	33	59	713	4	4	3	3	3	5	5	5	5	4	3	3	4	4
50105	C	MONTRÉAL	1212 RUE DRUMMOND	9/1/1997	12/31/2001	1 HR	0	1	4	7	11	14	19	25	33	39	61	131	1341	10	12	9	7	9	10	10	12	10	7	7	7	9	8
50109	C	MONTRÉAL	2495 RUE DUNCAN	1/22/2001	12/31/2001	1 HR	0	2	5	8	12	15	21	27	38	44	67	85	202	---	13	10	---	---	---	---	---	14	11	8	7	7	---	
50110	C	MONTRÉAL	11280 BOUL. PIE IX	1/10/2001	12/31/2001	1 HR	0	1	4	7	11	15	22	29	39	46	70	80	320	18	14	10	8	7	9	11	11	---	8	8	7	10	10
50126	R	MONTRÉAL	20965 CHEMIN SAINTE-MARIE	10/8/1997	12/31/2001	1 HR	0	0	2	5	9	12	17	24	31	38	59	131	1356	8	10	6	5	7	8	9	9	8	6	6	6	7	8
50128	C	MONTRÉAL	90-A RUE HERVÉ-SAINT-MARTIN	6/21/2000	12/31/2001	1 HR	0	1	3	5	9	12	18	24	31	36	54	109	531	11	9	7	6	7	10	8	9	8	8	7	5	8	8
50129	R	MONTRÉAL	12400 WILFRID-OUELLETTE	12/4/1998	12/31/2001	1 HR	0	0	3	6	10	14	21	28	38	48	79	116	782	13	13	8	5	8	10	9	9	9	7	8	8	9	10
50131	C	MONTRÉAL	3250 STE-CATHERINE EST	4/5/2001	12/30/2001	1 HR	0	1	4	7	11	14	20	25	32	38	50	55	226	---	---	---	7	8	10	11	---	7	8	9	8	---	
50308	I	QUÉBEC	600 RUE DES SABLES	4/7/1998	12/31/2001	1 HR	0	1	3	6	10	13	19	25	35	45	129	271	1214	11	15	9	7	8	9	9	8	8	7	7	7	9	11
50801	R	TROIS-RIVIÈRES	HART & STE-CECILE	1/1/1998	12/31/2001	1 HR	0	0	3	6	9	12	17	22	28	34	54	182	1312	9	10	7	6	8	9	8	9	8	9	8	6	6	6	8	7
51201	I	SHAWINIGAN	FRIGON & LAVAL	1/1/1998	12/31/2001	1 HR	0	0	4	8	15	22	39	67	117	188	504	967	1327	18	19	23	27	32	24	12	13	13	12	13	11	18	41
54401	A	SAINT-ANICET	1128 DE LA GUERRE	8/1/1997	12/31/2001	1 HR	0	0	2	4	7	10	16	20	27	33	55	253	1375	7	8	5	4	7	8	8	8	7	5	4	4	6	7
54501	U	L'ASSOMPTION	L'ASSOMPTION	8/1/1998	12/31/2001	1 HR	0	0	2	5	9	12	17	22	28	33	48	71	1019	9	9	5	5	6	9	8	9	8	6	6	6	7	7
55301	A	L'ACADIE	1134 ROUTE 219	11/1/1999	12/31/2001	1 HR	0	0	1	3	6	8	13	17	23	27	39	60	717	6	6	4	4	5	6	5	7	5	5	4	4	5	6
60104	C	OTTAWA	RIDEAU & WURTEMBURG	1/1/1998	12/31/2001	1 HR	0	1	3	5	8	11	16	20	27	32	47	55	1353	7	9	6	6	7	8	9	9	8	6	5	5	7	7
60203	R	WINDSOR	9725 RIVERSIDE DR. EAST	3/17/1999	12/31/2000	1 HR	0	1	5	8	14	18	25	34	43	51	82	140	638	15	8	9	8	11	16	17	13	13	10	10	7	12	11
60204	C	WINDSOR	467 UNIVERSITY AVE. WEST	1/1/2001	12/31/2001	1 HR	0	1	4	7	12	15	20	27	35	41	55	72	342	9	7	6	8	9	15	14	13	9	7	10	6	9	9
60403	I	TORONTO	EVANS & ARNOLD AVE.	1/1/1997	2/13/2001	1 HR	0	2	5	8	13	17	22	29	36	41	57	71	1031	9	10	8	8	13	13	14	13	13	9	8	7	10	9
60415	R	TORONTO	QUEENSWAY W & HURONTARIO	1/1/1997	12/31/2001	1 HR	0	1	4	7	11	14	19	26	32	37	50	140	1395	8	8	7	7	10	12	11	12	10	7	8	7	9	8
60421	C	TORONTO	YONGE ST. & FINCH AVE.	1/1/1998	12/31/2001	1 HR	0	1	3	6	11	14	20	27	35	40	56	90	1437	8	8	6	7	10	12	12	12	11	8	7	6	9	9
60424	C	TORONTO	BAY & WELLESLEY	1/1/1998	12/31/2001	1 HR	0	2	4	7	11	14	20	27	34	40	58	78	1045	8	8	6	7	12	12	12	13	10	8	7	6	9	8
60428	R	TORONTO	525 MAIN ST. N. BRAMPTON	7/1/2000	12/31/2001	1 HR	0	1	3	7	11	15	21	28	37	43	66	88	539	8	7	7	8	11	18	11	13	9	8	7	6	9	9
60429	R	TORONTO	JUDSON ST. & ETONA CT.	3/19/2001	12/31/2001	1 HR	0	2	4	8	13	17	25	33	40	44	56	72	282	---	---	---	9	11	17	11	14	11	10	11	7	---	
60430	C	TORONTO	125 RESOURCES ROAD	1/1/2000	12/31/2000	1 HR	0	1	4	7	12	15	21	26	33	36	51	63	344	8	10	9	7	8	11	11	13	12	11	7	7	10	8
60512	C	HAMILTON	ELGIN & KELLY	1/1/1998	12/31/2001	1 HR	0	2	5	9	14	17	25	32	41	47	66	108	1391	9	10	9	11	16	17	14	15	13	10	9	7	12	10
60513	R	HAMILTON	VICKERS RD. & EAST 18TH. ST.	1/1/1998	12/31/2001	1 HR	0	1	4	7	12	16	23	30	40	46	67	102	1295	8	9	7	11	14	13	13	13	11	7	7	5	10	10
60708	I	SAULT STE. MARIE	BONNEY STREET	1/1/2000	9/25/2001	1 HR	0	1	3	7	15	20	30	41	52	62	104	191	613	11	10	11	13	15	16	13	13	10	11	9	7	12	14
60807	R	THUNDER BAY	615 JAMES STREET SOUTH	6/1/2001	12/31/2001	1 HR	0	1	3	4	7	9	12	17	22	26	51	119	193	---	---	---	---	---	---	---	7	6	5	5	6	4	---	
60903	C	LONDON	900 HIGHBURY AVENUE	1/1/2001	12/31/2001	1 HR	0	2	4	7	11	14	19	26	34	41	62	82	364	9	7	8	8	11	13	12	12	8	6	9	6	9	8
61004	R	SARNIA	FRONT ST. AT C.N. TRACKS	2/1/2000	12/31/2001	1 HR	0	1	3	7	12	16	23	29	37	43	60	84	596	10	9	8	8	11	13	11	13	11	10	8	7	10	10
61104	R	PETERBOROUGH	10 HOSPITAL DRIVE	1/12/2001	12/31/2001	1 HR	0	1	3	5	9	12	18	26	34	39	58	71	303	---	---	6	7	8	14	9	10	8	6	7	5	---	
61302	C	ST. CATHARINES	ARGYLE CRESCENT	1/1/1998	12/31/2001	1 HR	0	1	4	8	13	17	23	30	39	44	58	81	1310	8	10	9	9	13	14	14	13	11	8	7	6	10	10
61502	C	KITCHENER	WEST AVE. & HOMEWOOD	1/1/1998	12/31/2001	1 HR	0	0	3	7	12	16	22	29	39	45	65	80	1185	8	9	8	8	13	13	12	13	9	7	7	5	9	10
61701	R	OSHAWA	RITSON RD. & OLIVE AVE.	4/19/1997	12/31/2001	1 HR	0	1	4	7	11	15	21	27	35	41	56	83	1440	8	8	7	7	11	13	13	12	11	8	8	7	9	9
61802	R	GUELPH	70 DIVISION STREET	5/10/2000	12/31/2001	1 HR	0	1	3	6	10	13	19	25	33	39	56	72	515	7	6	6	8	9	14	9	12	10	8	7	6	9	8
62001	R	NORTH BAY	CHIPPEWA ST.	7/1/1999	12/31/2001	1 HR	0	0	2	4	7	9	14	18	24	30	48	61	636	5	5	5	5	7	8	6	7	6	6	5	4	6	6
62501	U	TIVERTON	BRUCE NUCLEAR VISITOR CTR	1/1/1998	12/31/2001	1 HR	0	1	3	5	9	12	17	23	32	38	56	104	919	6	6	6	7	10	10	9	11	7	7	6	4	8	8
62601	A	SIMCOE	EXPERIMENTAL FARM	1/1/1998	12/31/2001	1 HR	0	1	3	6	10	14	19	26	35	40	53	81	1338	6	7	6	6	10	12	12	13	11	7	7	5	8	9
63001	R	BURLINGTON	HWY 2 & NORTH SHORE BLVD.	1/11/2001	12/31/2001	1 HR	0	2	4	8	12	16	24	34	42	47	62	68	249	---	---	---	---	10	18	11	15	10	7	9	6	---	
63301	F	DORSET	HWY 117 & PAINT LAKE ROAD	5/12/1999	12/31/2001	1 HR	0	0	2	4	7	10	15	21	29	34	51	127	937	4	5	4	5	7	9	8	7	7	6	5	4	6	7
65001	R	BARRIE	83 PERRY STREET	12/1/2001	12/31/2001	1 HR	1	2	3	4	6	9	12	17	20	23	43	43	31	---	---	---	---	---	---	---	---	---	---	---	---	6	---	
65101	R	NEWMARKET	EAGLE ST. & McCAFFREY RD.	6/1/2001	12/31/2001	1 HR	0	1	3	6	10	14	22	30	38	44	59	61	196	---	---	---	---	---	---	---	9	11	9	7	8	6	---	
70118	R	WINNIPEG	JEFFERSON & SCOTIA	9/1/1997	12/31/2001	1 HR	0	1	3	5	7	9	12	15	20	24	44	141	1448	6	5	5	6	5	5	6	8	7	6	5	5	6	5
70119	C	WINNIPEG	65 ELLEN STREET	11/1/2000	12/31/2001	1 HR	0	1	3	4	7	8	12	15	19	21	37	70	399	5	5	6	7	5	6	6	6	6	5	4	5	5	5
70203	R	BRANDON	1430 VICTORIA AVENUE EAST	6/1/2001	12/31/2001	1 HR	0	0	2	4	7	9	13	16	22	27	44	165	172	---	---	---	---	---	---	---	6	7	7	5	---	4	---	
80110	C	REGINA	2505 11TH. AVENUE	1/1/2001	12/31/2001	1 HR	0	1	4	6	10	13	17	22	28	33	53	84	345	4	6	7	9	11	8	9	14	11	7	7	5	8	7
90121	I	EDMONTON	17 STREET & 105 AVENUE	9/1/2000	12/31/2001	1 HR	0	0	2	5	8	10	16	21	27	33	55	265	484	7	6	4	6	8	6	8	10	6	6	7	8	7	8
90122	R	EDMONTON	13335 127 ST	4/1/1998	12/31/2001	1 HR	0	1	4	7	11	14	19	25	34	41	88	416	1340	9	11	10	8	9	7	8	12	10	9	10	9	9	10
90130	C	EDMONTON	10255 - 104TH STREET	10/1/2000	12/31/2001	1 HR	0	0	2	4	7	9	12	16	21	25	40	264	431	6	5	4	5	5	4	4	9	5	4	6	7	5	6
90227	C	CALGARY	611-4TH STREET S.W.	10/1/1997	12/31/2001	1 HR	0	1	3	5	9	11	15	19	26	32	67	434	1433	9	9	7	6	7	6	7	11	7	6	7	6	7	9
90302	R	RED DEER	73 STREET & RIVERSIDE DRIVE	1/1/2001	12/31/2001	1 HR	0	0	2	4	7	9	12	15	20	25	41	154	347	5	5	4	5	6	4	5	9	5	4	6	7	5	6
90601	R	FORT SASKATCHEWA	9209A 96TH AVE	1/1/2001	12/31/2001	1 HR	0	0	3	5	8	12	20	30	46	57	74	78	61	---	---	---	---	---	---	---	---	---	---	---	5	12	---	
90701	R	FORT MCMURRAY	FRANKLIN AVENUE	1/1/1998	12/31/2001	1 HR	0	0	3	5	7	9	12	16	24	30	92	265	1417	6	7	6	6	6	6	6	7	6	6	5	5	6	8
90702	R	FORT MCMURRAY	TIMBERLEA SUBDIVISION	1/1/1999	12/31/2001	1 HR	0	0	1	2	4	6	8	11	16	21	49	172	1086	4	3	4	4	4	4	4	3	3	3	4	4	4	5
90801	R	FORT MACKAY	MAIN STREET	1/1/1999	12/31/2001	1 HR	0	0	1	3	5	7	10	13	17	20	36	102	1080	5	5	5	4	3	4	4	4	4	4	4	5	4	5
91201	F	HIGHTOWER RIDGE	SE 11 54 2 W6	5/1/2000	12/31/2001	1 HR	0	0	0	0	0	1	2	4	6	9	20	49	580	0	1	0	0	1	1	1	2	0	0	1	0	1	2
91301	A	TOMAHAWK	SE 2 51 6 W5	5/1/2000	12/31/2001	1 HR	0	0	0	0	2	3	5	8	12	15	25	51	556	1	0	0	1	1	1	2	4	2	2	2	3	2	3
91801	U	FORT CHIPEWYAN	FORT CHIPEWYAN	1/1/2001	12/31/2001	1 HR	0	0	0	1	2	3	4	5	7	8	20	53	363	1	1	2	2	1	2	2	2	1	1	1	2	2	2
100134	R	VANCOUVER	3153 TEMPLETON STREET	1/1/1999	12/31/2001	1 HR	0	1	4	6	8	10	13	17	22	26	40	59	1015	8	8	6	6	6	6	6	7	7	8	9	6	7	5
100202	C	PRINCE GEORGE	1011 4TH AVENUE	1/1/1998	12/31/2001	1 HR	0	0	3	6	11	15	21	28	40	50	80	139	1429	11	13	9	8	7	7	8	9	10	10	10	9	9	10
100304	C	VICTORIA	923 TOPAZ	5/1/1998	12/31/2001	1 HR	0	0	2	4	7	9	13	17	25	34	61	157	1272	6	8	6	6	5	4	5	5	6	8	9	5	6	7
100307	R	VICTORIA	2005 SOOKE ROAD	1/1/2001	12/31/2001	1 HR	0	0	2	3	5	6	8	10	13	16	33	43	365	5	5	4	3	4	2	3	4	4	4	6	3	4	4
100308	C	VICTORIA	3300 WISHART ROAD	2/1/2000	12/31/2001	1 HR	0	0	2	4	6	7	10	14	20	25	41	57	507	6	6	5	4	4	2	3	4	5	5	8	6	5	5
100402	C	KAMLOOPS	MAYFAIR STREET	1/1/1998	12/31/2001	1 HR	0	0	2	4	7	8	11	14	17	20	38	184	1364	7	5	4	5	5	4	5	6	5	5	6	7	6	5
100701	C	KELOWNA	3333 COLLEGE WAY	1/1/1998	12/31/2001	1 HR	0	0	2	4	7	9	12	15	18	21	47	86	1405	6	7	5	5	4	3	4	6	6	7	8	5	6	5
101004	R	ABBOTSFORD	31790 WALMSLEY AVENUE	6/1/2001	8/31/2001	1 HR	0	4	6	7	10	11	13	16	19	21	32	32	47	---	---	---	---	---	---	8	8	---	---	---	---	---	
101101	R	CHILLIWACK	46244 AIRPORT ROAD	6/1/1995	12/31/2001	1 HR	0	0	3	5	7	9	12	15	18	22	35	82	1396	4	4	5	6	5	5	6	8	8	7	5	3	6	5
101202	R	PITT MEADOWS	18477 DEWDNY TRUNK	1/1/1999	12/31/2001	1 HR	0	0	3	5	8	10	14	17	21	25	39	63	1065	5	5	5	6	6	6	8	8	8	7	7	5	6	6
101701	R	QUESNEL	585 CALLANAN STREET	3/10/2000	12/31/2001	1 HR	0	0	2	5	9	12	17	22	30	34	50	83	647	10	13	8	6	6	5	5	7	6	8	10	10	7	8
101702	R	QUESNEL	950 MOUNTAIN ASH ROAD	3/16/2001	12/31/2001	1 HR	0	0	1	4	7	11	16	22	30	36	66	120	288	---	---	---	5	4	4	5	8	7	6	8	9	---	
101703	R	QUESNEL	501 PINECREST ROAD	3/10/2000	12/31/2001	1 HR	0	0	2	5	8	10	14	19	27	33	53	75	658	8	10	7	5	5	4	4	7	6	7	10	8	6	7
101704	R	QUESNEL	CORRELIEU SCHOOL	11/22/2001	12/31/2001	1 HR	0	0	1	3	6	8	14	19	27	32	61	79	404	8	9	5	3	3	2	3	6	4	4	6	7	5	7
102102	R	NANAIMO	280 LABIEUX ROAD	1/1/1998	12/31/2001	1 HR	0	0	2	4	6	7	10	13	17	19	40	185	1444	4	4	4	5	4	3	5	5	4	7	6	4	5	5
102301	R	POWELL RIVER	WILDLIFE SANCTUARY	9/20/1998	12/31/2001	1 HR	0	0	1	2	4	5	8	11	15	18	37	124	1148	2	3	3	4	3	3	5	5	4	4	3	2	3	4
102701	R	WILLIAMS LAKE	1045 WESTERN AVENUE	1/31/2001	12/31/2001	1 HR	0	0	1	4	7	10	15	20	27	33	52	62	334	---	10	6	5	4	3	4	6	5	6	7	11	6	7
102702	R	WILLIAMS LAKE	SKYLINE SCHOOL	8/8/2001	12/31/2001	1 HR	0	0	2	4	7	9	14	18	24	28	36	60	145	---	---	---	---	---	---	---	7	5	4	6	7	---	
105101	R	HOUSTON	FIREHALL	7/26/2001	12/31/2001	1 HR	0	0	1	3	7	10	17	24	33	39	74	233	156	---	---	---	---	---	---	---	5	3	7	10	7	---	
105501	C	FORT ST. JOHN	10015 100TH AVENUE	3/12/2001	12/31/2001	1 HR	0	0	1	2	4	6	9	12	17	22	35	50	290	---	---	1	3	3	4	4	7	3	3	3	5	---	
105601	R	OSOYOOS	6601 89TH STREET	8/1/2001	12/31/2001	1 HR	0	0	2	4	6	8	11	15	20	26	52	87	153	---	---	---	---	---	---	---	7	4	4	6	4	---	
119003	C	WHITEHORSE	1091 - 1ST AVENUE	7/24/2001	12/30/2001	1 HR	0	0	0	1	2	3	5	8	12	15	24	40	161	---	---	---	---	---	---	---	3	1	2	2	2	---	

Table A3. PM10 24 Hour Summary Statistics (µg/m³)

STATION	C/R/I	CITY	LOCATION	START	END	ID	MIN	10	30	50	70	80	90	95	98	99	99.9	MAX
40203	R	SAINT JOHN	FOREST HILLS	11/1/1996	6/30/2001	24 HR	1	7	10	14	19	22	27	32	37	41	54	62
50109	C	MONTRÉAL	2495 RUE DUNCAN	1/1/1996	9/12/2000	24 HR	4	13	20	26	34	40	50	61	74	81	124	178
50110	C	MONTRÉAL	11280 BOUL. PIE IX	1/1/1996	12/31/2000	24 HR	4	10	15	20	27	32	41	50	62	72	102	130
60211	R	WINDSOR	COLLEGE & SOUTH ST.	1/1/1996	12/31/2001	24 HR	3	13	18	23	29	34	44	53	64	73	103	138
60302	R	KINGSTON	133 DALTON AVENUE	1/1/1996	12/31/1999	24 HR	0	6	11	16	23	28	38	46	57	66	97	108
60403	I	TORONTO	EVANS & ARNOLD AVE.	1/22/1997	2/13/2001	24 HR	2	11	16	20	26	29	36	42	49	54	73	77
60410	R	TORONTO	LAWRENCE & KENNEDY	11/22/1996	12/31/2001	24 HR	3	10	13	17	22	25	32	38	45	50	65	74
60413	R	TORONTO	ELMCREST ROAD	1/1/1999	12/31/2001	24 HR	3	9	13	17	23	27	33	38	48	55	68	74
60430	C	TORONTO	125 RESOURCES ROAD	1/1/2000	12/31/2000	24 HR	2	8	12	16	21	25	30	34	39	43	52	55
60512	C	HAMILTON	ELGIN & KELLY	1/1/1996	12/31/1998	24 HR	3	10	15	19	26	32	44	55	65	71	84	86
60519	I	HAMILTON	NIAGARA & LAND STREET	1/19/2000	12/31/2000	24 HR	2	12	20	28	36	42	49	57	65	72	84	88
60707	I	SAULT STE. MARIE	331 PATRICK ST.	1/1/1996	12/31/2001	24 HR	0	6	10	14	20	25	34	43	55	65	95	137
60903	C	LONDON	900 HIGHBURY AVENUE	1/1/1996	12/28/2000	24 HR	2	9	13	17	23	27	35	43	52	60	74	81
61004	R	SARNIA	FRONT ST. AT C.N. TRACKS	6/7/1996	12/31/2001	24 HR	1	8	12	16	23	27	35	42	51	57	69	83
61104	R	PETERBOROUGH	10 HOSPITAL DRIVE	11/26/1998	2/27/2001	24 HR	2	7	10	13	18	21	27	33	39	43	58	61
63001	R	BURLINGTON	HWY 2 & NORTH SHORE BLVD.	3/11/1999	4/25/2001	24 HR	0	9	13	16	21	24	30	35	41	46	65	69
63201	R	STOUFFVILLE	HWY 47 & HWY 48	1/1/1999	5/2/2001	24 HR	2	8	11	15	19	23	30	36	43	48	65	75
70118	R	WINNIPEG	JEFFERSON & SCOTIA	3/1/1995	7/31/1999	24 HR	3	8	11	15	21	25	32	39	48	60	82	88
70119	C	WINNIPEG	65 ELLEN STREET	1/1/1995	12/31/2001	24 HR	2	9	13	18	24	29	37	44	55	63	100	116
70203	R	BRANDON	1430 VICTORIA AVENUE EAST	10/7/1997	12/31/2001	24 HR	0	7	10	15	24	30	43	58	79	94	147	162
80110	C	REGINA	2505 11TH. AVENUE	1/1/1999	12/31/2001	24 HR	0	9	16	23	34	43	55	71	91	105	137	162
90121	I	EDMONTON	17 STREET & 105 AVENUE	4/1/1998	12/31/2000	24 HR	3	8	13	18	26	32	41	49	62	75	112	150
90122	R	EDMONTON	13335 127 ST	1/1/1995	12/31/2001	24 HR	3	11	15	20	27	32	42	50	62	71	118	181
90227	C	CALGARY	611-4TH STREET S.W.	4/1/1995	12/31/2001	24 HR	4	12	17	22	29	35	42	50	62	70	124	238
90302	R	RED DEER	73 STREET & RIVERSIDE DRIVE	1/1/2000	12/31/2000	24 HR	2	8	12	17	22	27	38	46	54	58	67	73
91201	F	HIGHTOWER RIDG	SE 11 54 2 W6	6/1/1999	12/31/2001	24 HR	2	4	4	5	6	7	9	11	13	16	24	28
91301	A	TOMAHAWK	SE 2 51 6 W5	5/1/2000	12/31/2001	24 HR	0	5	7	9	13	16	22	27	35	41	58	61
91701	F	STEEPER	NE 12 48 22 W5	5/1/2000	12/31/2001	24 HR	2	4	6	7	9	12	19	26	37	47	66	72
100110	R	VANCOUVER	6400 E. HASTINGS & KENSINGTON	1/1/1995	12/31/2001	24 HR	2	6	8	10	13	16	19	22	26	29	52	58
100111	I	VANCOUVER	MOODY & ESPLANADE PORT MOODY	1/1/1995	12/31/2001	24 HR	2	7	10	12	16	19	22	26	30	32	54	59
100118	R	VANCOUVER	2550 WEST 10TH AVENUE	1/1/1995	12/31/2001	24 HR	2	8	10	13	15	17	21	24	28	30	48	53
100119	R	VANCOUVER	5455 RUMBLE STREET	1/1/1995	12/31/2001	24 HR	2	7	9	12	15	18	22	25	30	32	53	59
100125	R	VANCOUVER	8544 116TH AVE. DELTA	1/1/1995	1/31/2000	24 HR	2	6	8	11	15	17	21	25	29	32	50	62
100127	R	VANCOUVER	19000 & 72ND AVE. SURREY	1/1/1995	12/31/2001	24 HR	0	7	9	11	14	17	20	23	26	29	53	74
100128	R	VANCOUVER	WILLIAMS & ARAGON RICHMOND	1/1/1995	12/31/2001	24 HR	3	8	10	12	15	18	22	25	31	35	55	97
100132	R	VANCOUVER	16TH ST. & JONES AVE NORTH VAN	4/1/2000	12/31/2001	24 HR	3	7	9	11	15	17	20	22	25	28	33	35
100134	R	VANCOUVER	3153 TEMPLETON STREET	2/1/1998	12/31/2001	24 HR	4	8	10	13	16	18	21	25	30	33	44	54
100202	C	PRINCE GEORGE	1011 4TH AVENUE	1/1/1995	12/31/2001	24 HR	0	7	12	16	22	27	36	45	56	66	129	155
100203	C	PRINCE GEORGE	1108 INDUSTRIAL WAY	9/28/1996	12/31/2001	24 HR	1	8	13	18	26	32	44	55	69	79	111	127
100205	R	PRINCE GEORGE	GLADSTONE SCHOOL	1/1/1998	12/31/2000	24 HR	1	5	8	12	17	21	27	33	43	48	60	74
100209	R	PRINCE GEORGE	7310 CLUFF	1/1/1999	2/14/2001	24 HR	2	5	6	8	11	13	16	20	26	32	63	77
100308	C	VICTORIA	3300 WISHART ROAD	1/3/2001	12/31/2001	24 HR	4	7	10	12	14	16	20	24	29	33	52	53
100402	C	KAMLOOPS	MAYFAIR STREET	1/1/1995	12/31/2001	24 HR	0	7	10	12	16	19	24	28	40	53	120	199
100701	C	KELOWNA	3333 COLLEGE WAY	1/1/1995	12/31/2001	24 HR	0	7	10	13	17	21	26	31	40	46	64	74
101002	R	ABBOTSFORD	33660 SOUTH FRASER HIGHWAY	1/1/1995	9/17/1998	24 HR	3	7	11	14	18	21	26	30	36	41	66	73
101003	R	ABBOTSFORD	32995 BEVAN AVE.	9/18/1998	12/31/2001	24 HR	2	7	9	12	15	18	22	25	28	32	50	60
101101	R	CHILLIWACK	46244 AIRPORT ROAD	1/1/1995	12/31/2001	24 HR	2	6	9	11	15	18	23	27	33	38	63	94
101301	U	LANGLEY	23752 52ND AVENUE	1/1/1995	12/31/2001	24 HR	1	6	9	11	14	16	20	23	26	29	34	48
101401	U	HOPE	62715 AIRPORT ROAD	12/1/1996	12/31/2001	24 HR	2	5	7	9	12	14	18	22	26	28	44	56
101501	R	MAPLE RIDGE	23124 118TH AVENUE	2/1/1998	8/31/2001	24 HR	3	6	8	11	14	16	19	22	26	29	52	71
101601	R	SQUAMISH	38075 2ND AVENUE	1/1/1998	12/31/2001	24 HR	1	6	9	12	16	19	24	29	34	37	44	47
101701	R	QUESNEL	585 CALLANAN STREET	1/1/1995	12/31/2001	24 HR	1	8	13	18	25	30	39	50	67	84	149	201
101702	R	QUESNEL	950 MOUNTAIN ASH ROAD	5/24/1995	12/31/2001	24 HR	0	6	10	14	18	22	29	37	47	55	87	101
101703	R	QUESNEL	501 PINECREST ROAD	6/9/1995	12/31/2001	24 HR	1	8	13	18	26	32	42	51	64	74	99	142
101704	R	QUESNEL	CORRELIEU SCHOOL	1/1/2001	12/31/2001	24 HR	2	6	9	12	15	18	24	29	35	37	41	46
101801	R	CRESTON	PRINCE CHARLES SECONDARY SCHO	1/1/1995	12/31/2000	24 HR	0	7	11	15	20	25	32	41	57	69	94	107
101901	R	CRANBROOK	ADJACENT TO 1333 14TH AVENUE S	1/1/1995	11/29/1998	24 HR	0	6	10	14	19	23	31	44	60	72	101	107
102103	R	NANAIMO	CEDAR 7 WOOBANK RD	4/1/2000	12/31/2001	24 HR	2	6	8	10	12	14	17	19	21	23	32	34
102201	R	TRAIL	BUTLER PARK	1/1/1995	5/8/2000	24 HR	1	7	10	14	17	20	24	28	33	40	73	103
102301	R	POWELL RIVER	WILDLIFE SANCTUARY	1/1/1998	12/31/2001	24 HR	1	5	6	8	10	12	16	19	23	27	41	43
102302	C	POWELL RIVER	WILDWOOD MOTORS	1/1/2001	12/31/2001	24 HR	3	5	6	7	9	10	12	13	16	18	21	21
102401	R	SMITHERS	4020 BROADWAY AVENUE	10/1/1997	12/31/2001	24 HR	1	7	10	13	18	21	28	35	46	57	97	176
102501	R	TERRACE	104 - 3220 EBY STREET	11/1/1997	12/31/2001	24 HR	2	5	8	10	14	18	25	31	41	47	82	90
102601	R	PORT ALBERNI	5410 ARGYLE STREET	9/16/1997	12/31/2001	24 HR	1	5	7	9	11	13	16	18	22	25	41	45
102701	R	WILLIAMS LAKE	1045 WESTERN AVENUE	1/1/1995	12/31/2001	24 HR	0	8	11	15	21	25	31	38	47	54	90	144
102801	R	CAMPBELL RIVER	ADJACENT TO 660 WESTMERE	12/8/1995	12/31/2001	24 HR	2	7	9	11	13	15	18	20	24	27	42	54
102802	R	CAMPBELL RIVER	2662 TYEE SPIT ROAD	1/1/1998	12/31/2001	24 HR	2	7	9	11	14	16	20	23	28	31	58	65
103202	R	GOLDEN	835 9TH AVENUE SOUTH	2/11/1999	12/31/2001	24 HR	3	11	16	22	29	34	44	60	94	108	144	157
103901	R	KITIMAT	653 COLUMBIA STREET	8/11/1998	12/31/2001	24 HR	1	4	5	6	8	10	12	15	19	21	29	36
104401	R	PORT EDWARD	770 PACIFIC STREET	1/1/1999	12/31/2001	24 HR	1	3	4	5	7	9	11	14	16	18	23	26
104501	R	QUADRA ISLAND	LIGHTHOUSE ROAD	1/1/1999	12/31/2001	24 HR	1	6	8	10	12	14	16	18	21	22	30	32
104601	R	TELKWA	1304 BIRCH STREET	1/2/1999	12/31/2001	24 HR	1	6	9	12	16	19	27	33	41	47	71	84
104701	R	PRINCE RUPERT	HIGHWAY 16	1/1/1999	12/31/2001	24 HR	0	3	4	5	7	9	12	14	17	19	24	26
104801	R	DUNCAN	6364 DEYKIN AVENUE	1/1/1999	12/31/2001	24 HR	2	6	8	10	12	14	17	19	23	25	30	32
105101	R	HOUSTON	FIREHALL	1/1/2000	12/31/2001	24 HR	2	7	10	13	18	21	28	35	44	53	81	92
105201	R	BURNS LAKE	FIRE CENTRE	1/1/2000	12/31/2001	24 HR	2	6	10	13	18	21	30	41	58	71	102	111
105301	R	LANGDALE	FORRES ROAD	1/9/2001	12/31/2001	24 HR	3	6	7	9	11	12	15	16	18	21	31	33
105401	R	BOSTON BAR	47864 OLD BOSTON BAR ROAD	1/1/2001	12/31/2001	24 HR	3	8	12	16	21	26	32	38	47	50	59	60
105501	C	FORT ST. JOHN	10015 100TH AVENUE	3/8/2001	12/31/2001	24 HR	2	7	11	16	23	29	37	43	52	57	64	66

Table A4. PM2.5 24 Hour Summary Statistics (µg/m³)

STATION	C/R/I	CITY	LOCATION	START	END	ID	MIN	10	30	50	70	80	90	95	98	99	99.9	MAX
10102	C	ST. JOHN'S	354 WATER STREET	1/1/1998	12/31/200	24 HR	0	2	4	5	6	7	9	11	13	15	26	31
10301	C	CORNER BROOK	BROOK STREET	7/1/2001	12/31/200	24 HR	0	2	3	4	6	7	11	13	20	26	41	41
30120	R	DARTMOUTH	LAKE MAJOR ROAD	1/1/2001	12/31/200	24 HR	1	5	7	10	13	16	23	33	50	54	71	74
30310	C	SYDNEY	COUNTY JAIL	7/1/1998	12/31/200	24 HR	0	2	4	5	6	7	10	12	14	18	27	33
30501	U	KEJIMKUJIK	NATIONAL PARK	1/1/1998	12/31/200	24 HR	0	1	2	3	5	6	8	11	16	19	33	36
40103	C	FREDERICTON	ABERDEEN STREET	4/1/1999	12/31/200	24 HR	0	1	3	4	6	8	11	14	17	19	28	29
40203	R	SAINT JOHN	FOREST HILLS	11/1/1996	12/31/200	24 HR	0	2	3	5	7	9	13	16	23	25	75	82
40302	R	MONCTON	5 THANET STREET	10/1/1999	12/31/200	24 HR	0	1	2	3	5	7	9	11	15	18	28	32
40901	U	ST. ANDREWS	HUNTSMAN MARINE RESIDENCI	5/1/1998	12/31/200	24 HR	0	1	2	3	4	5	8	10	14	17	28	33
41301	R	BATHURST	430 ST. PETERS AVENUE	1/1/2000	12/31/200	24 HR	0	1	2	3	5	6	8	9	12	14	29	33
50105	C	MONTRÉAL	1212 RUE DRUMMOND	9/1/1997	12/31/200	24 HR	0	3	5	8	10	13	17	21	27	30	52	74
50109	C	MONTRÉAL	2495 RUE DUNCAN	1/22/2001	12/31/200	24 HR	1	4	6	9	12	15	19	22	30	34	42	42
50110	C	MONTRÉAL	11280 BOUL. PIE IX	1/10/2001	12/31/200	24 HR	0	3	5	8	11	14	20	25	32	36	46	52
50126	R	MONTRÉAL	20965 CHEMIN SAINTE-MARIE	10/8/1997	12/31/200	24 HR	0	1	3	6	8	11	16	20	25	30	55	80
50128	C	MONTRÉAL	90-A RUE HERVÉ-SAINT-MARTIN	6/21/2000	12/31/200	24 HR	0	2	4	6	9	12	16	21	25	29	38	39
50129	R	MONTRÉAL	12400 WILFRID-OUELLETTE	12/4/1998	12/31/200	24 HR	0	2	4	7	11	13	19	24	30	34	47	58
50131	C	MONTRÉAL	3250 STE-CATHERINE EST	4/5/2001	12/30/200	24 HR	0	3	5	8	11	13	18	21	26	30	41	42
50308	I	QUÉBEC	600 RUE DES SABLES	4/7/1998	12/31/200	24 HR	0	2	4	7	10	12	17	22	28	37	64	89
50801	R	TROIS-RIVIÈRES	HART & STE-CECILE	1/1/1998	12/31/200	24 HR	0	2	4	6	9	11	15	18	22	26	38	45
51201	I	SHAWINIGAN	FRIGON & LAVAL	1/1/1998	12/31/200	24 HR	0	4	8	12	19	26	37	52	85	114	225	407
54401	A	SAINT-ANICET	1128 DE LA GUERRE	8/1/1997	12/31/200	24 HR	0	1	3	5	7	10	14	17	22	26	51	59
54501	U	L'ASSOMPTION	L'ASSOMPTION	8/1/1998	12/31/200	24 HR	0	1	3	6	9	11	15	19	23	27	38	45
55301	A	L'ACADIE	1134 ROUTE 219	11/1/1999	12/31/200	24 HR	0	1	2	4	6	8	12	15	19	21	29	32
60104	C	OTTAWA	RIDEAU & WURTEMBURG	1/1/1998	12/31/200	24 HR	0	2	4	6	8	11	14	18	23	27	42	45
60203	R	WINDSOR	9725 RIVERSIDE DR. EAST	3/17/1999	12/31/200	24 HR	0	3	6	9	14	17	23	28	36	43	65	69
60204	C	WINDSOR	467 UNIVERSITY AVE. WEST	1/1/2001	12/31/200	24 HR	0	3	5	8	11	14	19	24	30	34	46	48
60403	I	TORONTO	EVANS & ARNOLD AVE.	1/1/1997	2/13/2001	24 HR	0	4	6	9	12	15	20	25	30	35	46	51
60415	R	TORONTO	QUEENSWAY W & HURONTARIC	1/1/1997	12/31/200	24 HR	0	3	5	7	10	13	18	22	27	30	37	42
60421	C	TORONTO	YONGE ST. & FINCH AVE.	1/1/1998	12/31/200	24 HR	0	2	4	7	10	13	19	24	30	35	45	54
60424	C	TORONTO	BAY & WELLESLEY	1/1/1998	12/31/200	24 HR	0	3	5	7	10	13	18	23	30	34	47	51
60428	R	TORONTO	525 MAIN ST. N. BRAMPTON	7/1/2000	12/31/200	24 HR	0	2	5	7	11	13	18	25	32	39	53	54
60429	R	TORONTO	JUDSON ST. & ETONA CT.	3/19/2001	12/31/200	24 HR	0	3	6	9	12	16	23	29	35	40	44	45
60430	C	TORONTO	125 RESOURCES ROAD	1/1/2000	12/31/200	24 HR	0	3	6	8	11	14	18	22	27	29	40	43
60512	C	HAMILTON	ELGIN & KELLY	1/1/1998	12/31/200	24 HR	0	4	6	10	14	17	23	28	34	38	52	69
60513	R	HAMILTON	VICKERS RD. & EAST 18TH. ST.	1/1/1998	12/31/200	24 HR	0	2	5	7	12	15	21	26	34	40	51	59
60708	I	SAULT STE. MARIE	BONNEY STREET	1/1/2000	9/25/2001	24 HR	0	2	5	9	15	19	26	33	40	46	59	67
60807	R	THUNDER BAY	615 JAMES STREET SOUTH	6/1/2001	12/31/200	24 HR	0	2	3	5	7	8	11	14	17	19	21	22
60903	C	LONDON	900 HIGHBURY AVENUE	1/1/2001	12/31/200	24 HR	1	3	5	7	11	13	17	25	29	34	47	52
61004	R	SARNIA	FRONT ST. AT C.N. TRACKS	2/1/2000	12/31/200	24 HR	0	2	4	8	12	15	21	25	30	34	47	49
61104	R	PETERBOROUGH	10 HOSPITAL DRIVE	1/12/2001	12/31/200	24 HR	1	2	4	6	9	11	16	23	31	35	48	52
61302	C	ST. CATHARINES	ARGYLE CRESCENT	1/1/1998	12/31/200	24 HR	0	3	5	8	12	15	21	26	34	38	47	58
61502	C	KITCHENER	WEST AVE. & HOMEWOOD	1/1/1998	12/31/200	24 HR	0	2	4	7	11	15	20	26	34	40	52	58
61701	R	OSHAWA	RITSON RD. & OLIVE AVE.	4/19/1997	12/31/200	24 HR	0	3	5	7	11	14	19	24	30	34	49	58
61802	R	GUELPH	70 DIVISION STREET	5/10/2000	12/31/200	24 HR	0	3	5	7	10	12	18	23	28	33	45	47
62001	R	NORTH BAY	CHIPPEWA ST.	7/1/1999	12/31/200	24 HR	0	1	3	4	6	8	12	15	21	25	38	46
62501	U	TIVERTON	BRUCE NUCLEAR VISITOR CTR	1/1/1998	12/31/200	24 HR	0	2	4	5	9	11	16	21	27	33	46	50
62601	A	SIMCOE	EXPERIMENTAL FARM	1/1/1998	12/31/200	24 HR	0	2	4	6	10	13	18	23	30	35	45	55
63001	R	BURLINGTON	HWY 2 & NORTH SHORE BLVD.	1/11/2001	12/31/200	24 HR	1	3	6	8	12	15	23	31	38	41	52	54
63301	F	DORSET	HWY 117 & PAINT LAKE ROAD	5/12/1999	12/31/200	24 HR	0	1	3	4	7	9	13	18	25	30	40	41
65001	R	BARRIE	83 PERRY STREET	12/1/2001	12/31/200	24 HR	2	2	3	4	6	9	12	15	16	16	16	16
65101	R	NEWMARKET	EAGLE ST. & McCAFFREY RD.	6/1/2001	12/31/200	24 HR	1	2	4	6	10	13	20	28	34	37	42	42
70118	R	WINNIPEG	JEFFERSON & SCOTIA	9/1/1997	12/31/200	24 HR	0	2	4	5	7	8	10	12	16	18	30	61
70119	C	WINNIPEG	65 ELLEN STREET	11/1/2000	12/31/200	24 HR	0	2	3	5	7	8	10	11	14	15	18	20
70203	R	BRANDON	1430 VICTORIA AVENUE EAST	6/1/2001	12/31/200	24 HR	0	2	4	5	7	8	10	11	14	17	20	20
80110	C	REGINA	2505 11TH. AVENUE	1/1/2001	12/31/200	24 HR	1	3	5	7	10	11	15	18	21	23	25	26
90121	I	EDMONTON	17 STREET & 105 AVENUE	9/1/2000	12/31/200	24 HR	0	2	4	6	8	10	13	16	20	23	44	47
90122	R	EDMONTON	13335 127 ST	4/1/1998	12/31/200	24 HR	0	3	6	8	11	13	17	20	25	32	66	109
90130	C	EDMONTON	10255 - 104TH STREET	10/1/2000	12/31/200	24 HR	0	2	3	5	6	8	10	12	17	20	36	38
90227	C	CALGARY	611-4TH STREET S.W.	10/1/1997	12/31/200	24 HR	0	3	4	6	8	10	13	16	19	24	70	179
90302	R	RED DEER	73 STREET & RIVERSIDE DRIVE	1/1/2001	12/31/200	24 HR	0	2	3	5	6	8	10	12	16	20	30	30
90601	R	FORT SASKATCHEWA	9209A 96TH AVE	1/1/2001	12/31/200	24 HR	0	2	3	5	9	11	19	26	42	45	51	52
90701	R	FORT MCMURRAY	FRANKLIN AVENUE	1/1/1998	12/31/200	24 HR	0	1	3	5	7	9	11	14	19	24	58	96
90702	R	FORT MCMURRAY	TIMBERLEA SUBDIVISION	1/1/1999	12/31/200	24 HR	0	1	2	3	4	5	7	9	11	13	23	26
90801	R	FORT MACKAY	MAIN STREET	1/1/1999	12/31/200	24 HR	0	1	2	4	5	7	8	10	12	14	19	21
91201	F	HIGHTOWER RIDGE	SE 11 54 2 W6	5/1/2000	12/31/200	24 HR	0	0	0	0	0	1	2	3	5	8	11	11
91301	A	TOMAHAWK	SE 2 51 6 W5	5/1/2000	12/31/200	24 HR	0	0	0	1	2	3	5	7	9	12	19	20
91801	U	FORT CHIPEWYAN	FORT CHIPEWYAN	1/1/2001	12/31/200	24 HR	0	0	1	1	2	2	3	4	5	6	10	11
100134	R	VANCOUVER	3153 TEMPLETON STREET	1/1/1999	12/31/200	24 HR	0	3	5	6	8	9	11	14	17	19	22	25
100202	C	PRINCE GEORGE	1011 4TH AVENUE	1/1/1998	12/31/200	24 HR	0	3	5	7	11	13	19	23	30	35	49	58
100304	C	VICTORIA	923 TOPAZ	5/1/1998	12/31/200	24 HR	0	2	4	5	7	8	11	13	17	21	30	33
100307	R	VICTORIA	2005 SOOKE ROAD	1/1/2001	12/31/200	24 HR	0	2	3	4	5	5	7	8	10	12	19	20
100308	C	VICTORIA	3300 WISHART ROAD	2/1/2000	12/31/200	24 HR	0	2	3	4	6	7	9	11	14	17	22	26
100402	C	KAMLOOPS	MAYFAIR STREET	1/1/1998	12/31/200	24 HR	0	2	3	5	6	8	10	12	14	16	24	40
100701	C	KELOWNA	3333 COLLEGE WAY	1/1/1998	12/31/200	24 HR	0	2	3	5	7	8	11	13	16	18	42	54
101004	R	ABBOTSFORD	31790 WALMSLEY AVENUE	6/1/2001	8/31/2001	24 HR	3	5	7	8	9	10	11	12	13	13	14	14
101101	R	CHILLIWACK	46244 AIRPORT ROAD	6/1/1995	12/31/200	24 HR	0	2	3	5	7	8	10	12	15	17	26	28
101202	R	PITT MEADOWS	18477 DEWDNY TRUNK	1/1/1999	12/31/200	24 HR	0	2	4	6	8	10	12	14	16	17	22	25
101701	R	QUESNEL	585 CALLANAN STREET	3/10/2000	12/31/200	24 HR	0	2	4	6	9	11	14	18	22	26	36	40
101702	R	QUESNEL	950 MOUNTAIN ASH ROAD	3/16/2001	12/31/200	24 HR	0	1	3	5	7	9	13	18	23	26	37	40
101703	R	QUESNEL	501 PINECREST ROAD	3/10/2000	12/31/200	24 HR	0	2	4	5	8	9	12	15	19	23	35	37
101704	R	QUESNEL	CORRELIEU SCHOOL	11/22/200	12/31/200	24 HR	0	1	2	4	6	8	11	15	20	23	31	33
102102	R	NANAIMO	280 LABIEUX ROAD	1/1/1998	12/31/200	24 HR	0	2	3	4	5	6	8	10	13	15	29	41
102301	R	POWELL RIVER	WILDLIFE SANCTUARY	9/20/1998	12/31/200	24 HR	0	1	2	3	4	5	6	8	10	12	17	23
102701	R	WILLIAMS LAKE	1045 WESTERN AVENUE	1/31/2001	12/31/200	24 HR	0	2	3	5	7	9	12	16	19	23	30	32
102702	R	WILLIAMS LAKE	SKYLINE SCHOOL	8/8/2001	12/31/200	24 HR	0	1	3	4	7	8	12	16	19	21	28	29
105101	R	HOUSTON	FIREHALL	7/26/2001	12/31/200	24 HR	0	1	2	4	8	9	13	19	24	31	41	42
105501	C	FORT ST. JOHN	10015 100TH AVENUE	3/12/2001	12/31/200	24 HR	0	1	2	3	4	5	7	9	13	19	29	30
105601	R	OSOYOOS	6601 89TH STREET	8/1/2001	12/31/200	24 HR	0	2	3	4	6	7	10	13	20	21	32	32
119003	C	WHITEHORSE	1091 - 1ST AVENUE	7/24/2001	12/30/200	24 HR	0	0	1	1	2	3	4	6	9	9	12	12