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DETERMINATION OF CONCENTRATIONS OF SELECTED FINE PARTICULATE AIR CONTAMINANTS IN SEVEN CANADIAN CITIES

A REPORT TO THE
ENVIRONMENTAL PROTECTION SERVICE
DEPARTMENT OF THE ENVIRONMENT

Prepared By

CONCORD SCIENTIFIC CORPORATION

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APPENDICES:

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1.0 BACKGROUND AND INTRODUCTION

1.1 Background

Studies of airborne particles in a number of areas have shown that most of the particle mass lies in two size fractions: those with aerodynamic diameters (d) < 2 μm and those for which d lies between 2 and 30 μm. It is also becoming more generally accepted that, from the viewpoint of human health, airborne particles with d < 15 μm are of greater importance than large particles. Particles falling within this size range are often referred to as inhalable particulates or IP. Furthermore, it is known that, generally, many of the potentially harmful substances such as Pb, As, SO_4^{-2}, and others, are heavily concentrated in the d < 2 μm fraction. However, up until the present, by far the most commonly used method in North America of determining the airborne particle loading has been high volume ("HI VOL") air sampling. This method does not, however, provide any information on the particle size distribution. Size information is extremely important, in addition to human health considerations, for assessment of such areas as: visibility reduction, pollutant dry deposition rates and precipitation scavenging.

Recently, single stage virtual impactors ("Dichotomous Samplers"), using teflon filter membranes as the collection medium, have become commercially available and are being considered as possible replacements/supplements to the HI VOL sampler as they divide the collected airborne particles into two size fractions d <2.5 μm and 2.5 < d < 15 μm, commonly called the Fine and Coarse Fractions respectively. These two fractions are of primary interest from the standpoint of air pollution control and for many purposes constitute an acceptable trade off between the size/mass information desired and important practical considerations such as cost.

1.2 Introduction

The Air Pollution Control Directorate of the Environmental Protection Service of Environment Canada (EPS) wished to carry out a field evaluation of the performance of one commercial model of dichotomous sampling instrument and at the same time to develop a protocol for field use of this instrument. An additional aim of the evaluation was to gather preliminary data on the total particle mass concentration and on the concentration of selected chemical species in the coarse and fine fractions, at a number of sites across Canada.

A specific objective was to compare the concentration of particulate constituents, especially lead, collected by rooftop and curbside samplers at the same site.

Concord Scientific Corporation was contracted to manage a project consisting of the following components:

1. co-ordination of sampling at seven National Air Pollution Surveillance (NAPS) network sites, one each in Halifax, Montreal, Ottawa, Toronto, Winnipeg, Edmonton and Vancouver;
2. development and execution of a protocol for sample handling and for transporting filters to and from the above sites;
3. selection and application of an appropriate analytical protocol, including gravimetric mass determination and analysis for the elements arsenic, cadmium, chromium and lead and the

ions sulphate and nitrate, in each of the two size fractions;

4. establishment of a quality control protocol for gravimetric and chemical analysis; and,
5. assembling, interpreting and presenting the requisite data.

1.3 Description of the Dichotomous Sampler

The sampler chosen for the study by EPS was the Andersen Samplers, Inc. Model 3000 manual dichotomous sampler (virtual impactor). The reader is referred to the literature for details of this instrument (1, 2, 3). Generally, the sampler consists of the following components:

1. sampling inlet,
2. single-stage virtual impactor separator for coarse and fine fractions,
3. collection filters for coarse and fine fraction particles,
4. operation and control electronics and vacuum manifold.

The sampling inlet serves both to eliminate particles larger than the specified cut off (15 µm) and to define the aerodynamic flow of the particle-laden airstream entering the impactor region. A typical design is illustrated in Figure 1.

The virtual impactor derives its name from the fact that the particles which undergo inertial separation impact initially into a void rather than directly onto a collection medium, as in a classical impactor, such as the cascade impactor. In the impactor stage (see Figure 2), separation of coarse from fine particles is achieved by differential air flow into two branches of the collection system. Fine particles follow the major volumetric air flow and pass onto one collection filter; whereas, coarse particles are unable to follow the streamlines of the rapid major flow and continue along the minor air flow branch and onto a second collection filter. The physical configuration of acceleration nozzles (jets) and baffles achieves a sharp differentiation between the two size fractions.

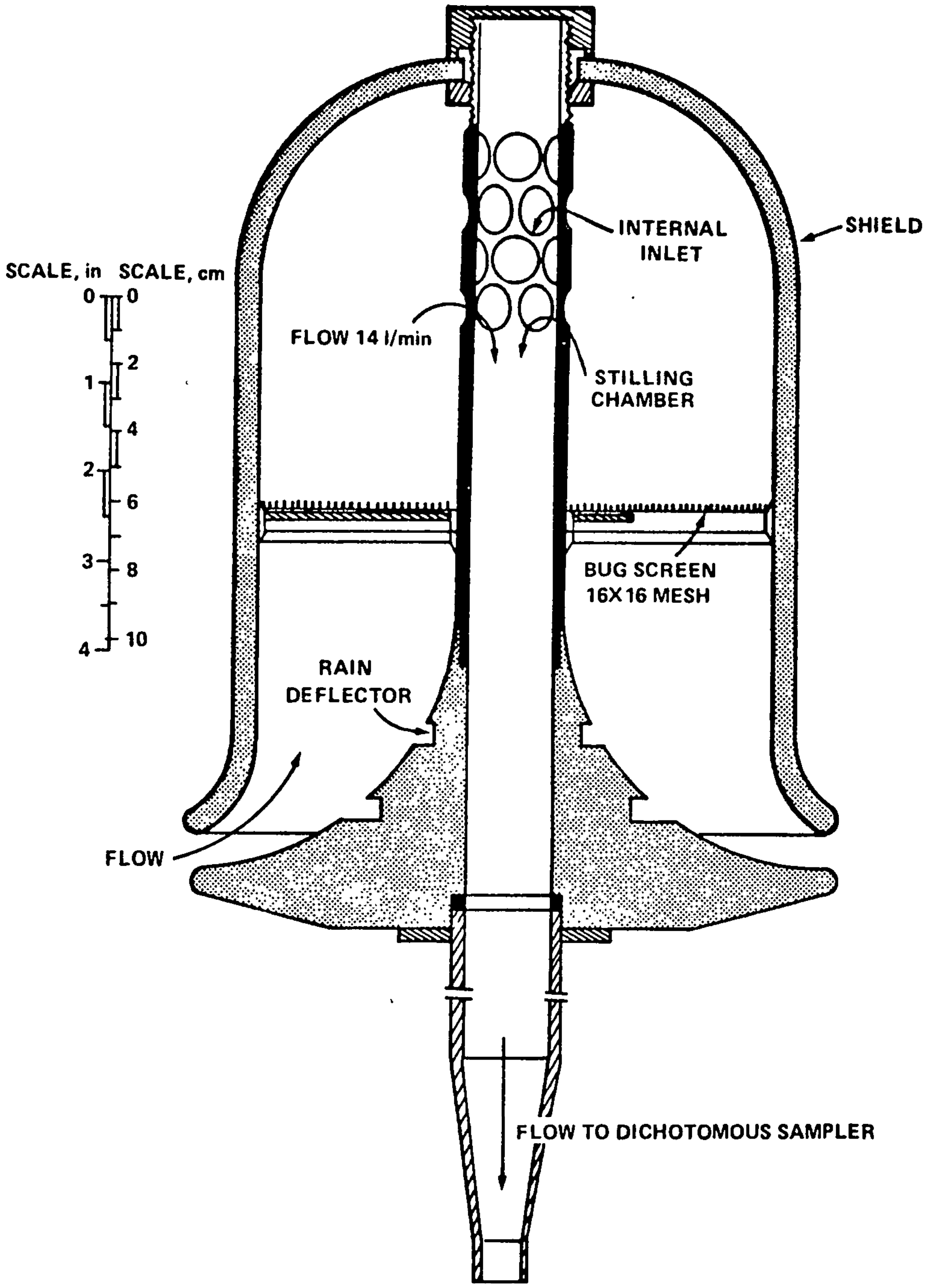


Figure 1. Early inlet for the dichotomous sampler.

Source: Stevens and Dzubay (1978).

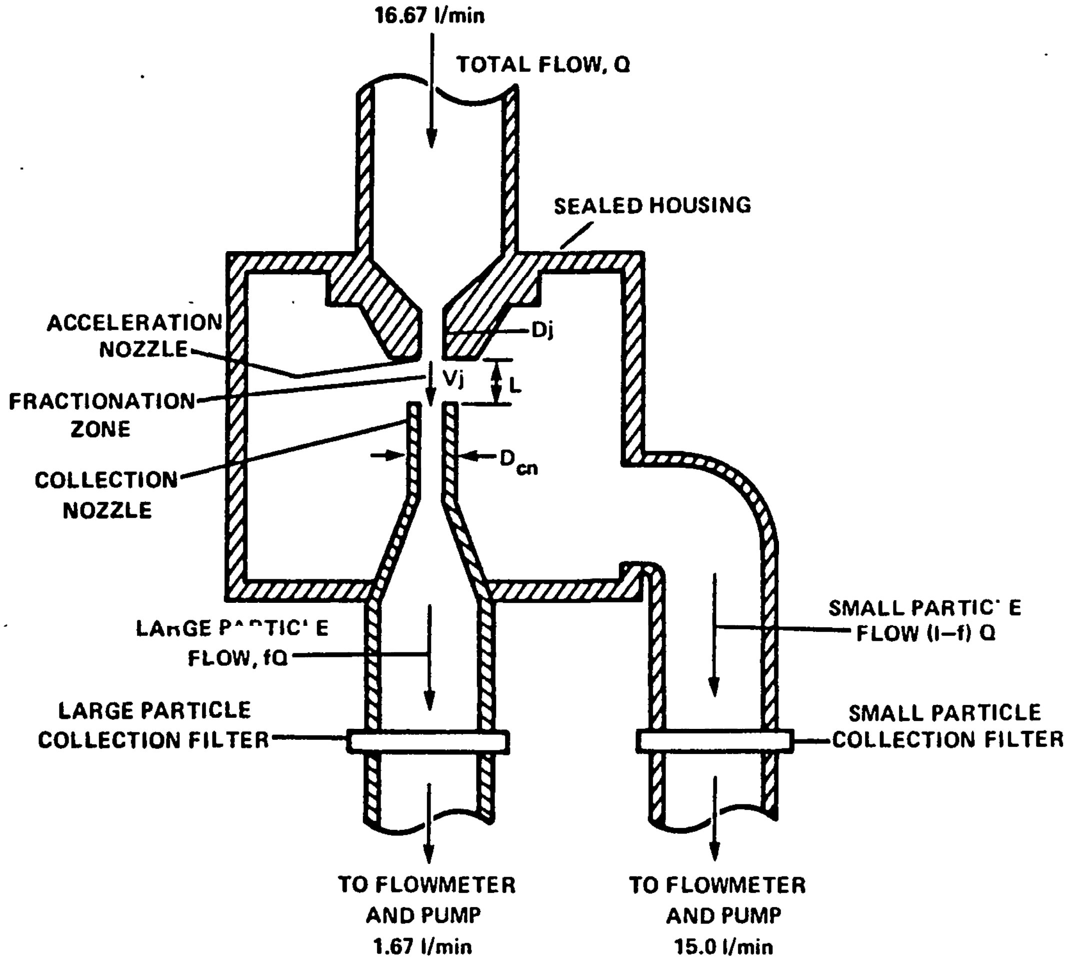


Figure 2. Dichotomous sampler separator.

Source: Loo et al. (1979)

The collection medium may be any appropriate material that will collect airborne particles efficiently in the flowrate regime of which the instrument is capable. The design of the instrument dictates a small format collection filter, commonly a 37 mm diameter disc. The collection medium that is preferred currently is a thin teflon polymer membrane, unsupported except at the edge of the disc. The specific filter format used for the Andersen sampler consists of a teflon membrane bonded to a narrow polyester support gasket.

These filters are loaded manually and exposed in pairs (coarse and fine fractions) during each operating period of the sampler.

The particle loading on the exposed filters may be determined either gravimetrically or by beta-ray absorption densitometry. For this study, mass loadings were determined by weighing the filters on a microbalance under controlled conditions.

Particle concentrations in the sampled air stream can be calculated from the measured filter weights (loaded and tare) and the recorded operating conditions of the instrument: flowrates in the coarse and fine branches, and so on.

Exposed filters may be subjected to chemical analysis similarly to any other sample of airborne particulate matter. The main constraint on the choice of analytical finish is the small sample format, hence small quantity of matter to be analyzed. A typical dichotomous sampler filter loading would be between 100 and 1000 micrograms, compared with, for example, the loading on an equivalent exposed area of a Hi Vol Filter of greater than 14,000 micrograms of material.

The following sections provide greater detail about the operation of the survey. Subsequent chapters present the results of the study and their interpretation in terms of the objectives established by EPS.

2.0 STUDY METHODOLOGY

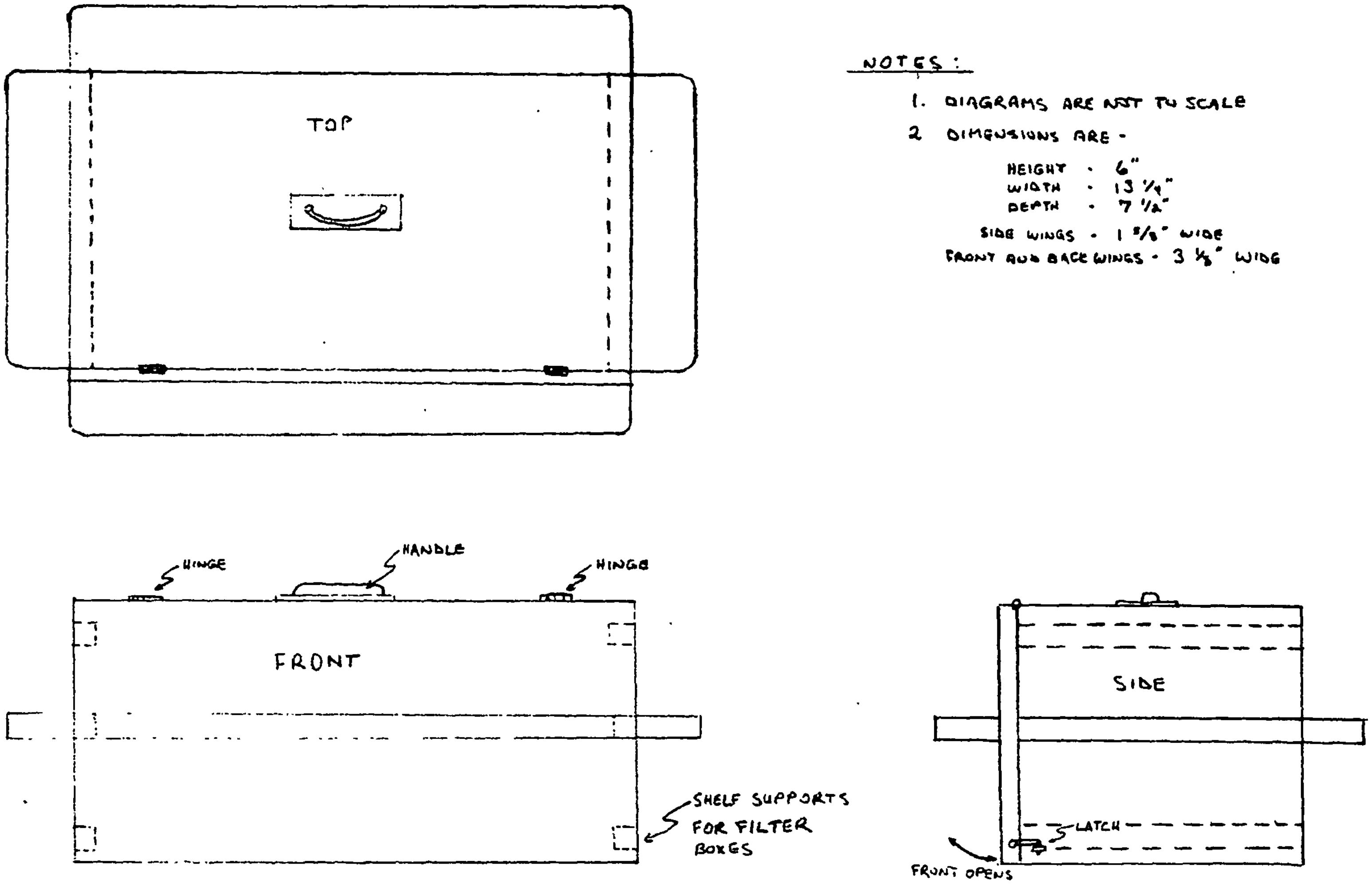
2.1 Sample Handling

Previous experience with exposed dichotomous sampler filters had indicated that collected particles may be lost from the filter surface during packaging, shipping and handling, especially from coarse fraction filters(4). Since filters from six of the seven sites would have to be shipped some distance to Toronto for processing, it was necessary to address the potential problem of mass loss.

A special wooden shipping box for filters was designed. A schematic drawing is given in Figure 3. The construction of the box discouraged its being positioned other than upright (wings on four sides, handle on top). Tip-N-Tell gauges (5) were affixed to the boxes prior to shipping from or back to Toronto. This device indicates whether a parcel has been tipped or otherwise mishandled during shipment. The intent of these precautions was, of course, to ensure that loaded filters would be maintained upright throughout their journey. The boxes were shipped by common carriers (air express). The effectiveness of the precautions is discussed in section 3.1.3.

Unexposed filters were all weighed by Concord Scientific in Toronto and placed in numbered plastic retaining rings designed to fit directly into the Andersen sampler filter holder. Filters (in retaining rings) were packaged in plastic petri dishes (Millipore part number PD1004700, tight fitting lid) and placed in a shipping box.

FIGURE 3. TIP-PROOF FILTER CARRIER



NOTES:

1. DIAGRAMS ARE NOT TO SCALE
2 DIMENSIONS ARE -

HEIGHT - 6"
WIDTH - 13 1/4"
DEPTH - 7 1/2"
SIDE WINGS - 1 5/8" WIDE
FRONT AND BACK WINGS - 3 1/8" WIDE

Filters packaged in this way could be shipped, removed from the petri dishes, loaded into the Andersen sampler, exposed, removed from the sampler, replaced in the petri dishes and returned to Toronto without the filter medium itself being touched by field personnel and without any possibility that the filter would become separated from its numbered label during the round trip.

2.2 Sampling Sites and Sampling Protocol

All sampling was carried out by provincial, municipal or federal agencies at the respective sites, which were all regular NAPS stations.

The sites were as follows-

1. Halifax: NAPS Station #30101C
   Location: Nova Scotia Technical College
2. Montreal: NAPS Station #50115C
   Location: Peel and Maisoneuve
3. Ottawa: NAPS Station #60101C
   Location: 88 Slater St.
   Comment: supplementary curbside sampler at same location
4. Toronto: NAPS Station #60401C
   Location: 67 College St.
   Comment: supplementary curbside sampler at 880 Bay Street
5. Winnipeg: NAPS Station #70119C
   Location: 65 Ellen St.
6. Edmonton: NAPS Station #90130C
   Location: 10255-104th St.
7. Vancouver: NAPS Station #00106R
   Location: 2294 West 10th Ave.

See Appendix VI for details of the NAPS sites.

Each site was supplied with one Andersen sampler by EPS, with the exception of the Ottawa and Toronto sites, which were each provided with an additional sampler for a supplementary curbside survey.

The samplers were operated under the established protocol of the NAPS network, with specific procedures for operating, calibrating and maintaining quality control for dichotomous samplers given by EPS to the operators.

Details of the EPS sampling protocol can be found in EPS documents (see Appendix V).

In addition, "control" samplers were operated when available side-by-side with the "experimental" samplers in Ottawa and Toronto. In Ottawa, the control sampler was another Andersen Model 3000, while in Toronto the control samplers were a Sierra Model 244 manual dichotomous sampler and an Andersen Model 3000. These two samplers did not operate on the NAPS sampling schedule but were located at the NAPS site.

2.3 Filter Specifications and Weighing

Tefweb polyester ring-supported teflon membrane filters, manufactured by Ghia Corporation (2 micrometer effective pore diameter), from a single lot were used for the study. These filters are somewhat different from the Ghia Zefluor filters used in the comparative study presented in Appendix II.

A Mettler Model Microgrammatic semi-microbalance was used for all weighings of blank (tare) and exposed filters during the study.

Tare weights of unexposed filters were determined for unconditioned filters prior to shipment to sampling sites. Exposed filters were conditioned for at least 24 hours in a humidified cabinet maintained at approximately 50% relative humidity by a saturated aqueous solution of $Mg(NO_3)_2.6H_2O$ at ambient room temperature of about 20^oC . The teflon filters are hydrophobic and have been shown to pick up very little mass by adsorption of moisture. Conditioning of exposed filters was done to provide a reference state for potentially hydrophilic or hygroscopic collected particles.

Any sampling-generated electrostatic charge on the exposed filters was reduced by a Simco corona discharge static eliminator prior to weighing. The objective of both of these conditioning methods was to achieve reproducible filter weighings.

Exposed filters were removed from their labelled retaining rings before weighing and replaced immediately afterward.

Several inter-laboratory comparisons of filter weight determination were carried out, involving Concord Scientific, Environment Canada and the Ontario Ministry of the Environment. The results of these studies are presented in Section 3.1.3.

2.4 Chemical Analysis

The EPS contract specified that the selection of analytical methods for the dichotomous sampler filters should be based on an inter-laboratory comparative study of several methods. Such a study was carried out, augmented by support from the Ontario Ministry of the Environment. The results of this study are presented in Appendix II . This appendix is essentially the report submitted to the Ministry of the Environment on the complete study.

The methods and performing laboratories selected on the basis of the comparative study were:

Species	Method	Lab
Arsenic	FAA(a)	XRAL(d)
Chromium	DCP(b)	XRAL
Cadmium	DCP	XRAL
Lead	DCP	XRAL
Sulphate	IC(c)	CSC(e)
Nitrate	IC	CSC

Notes:

(a) flameless atomic absorption spectrometry (by arsine generation)

(b) directly coupled plasma emission spectrometry

(c) ion exchange chromatography

(d) X-Ray Assay Laboratory Ltd.

(e) Concord Scientific Corporation

Exposed filters received at Concord Scientific were sectioned for analysis as follows. After the filters were weighed they were cut in half, leaving the filter membrane bonded to the polyester support ring. Curling of the cut sections was not excessive. Either a surgical scalpel or a steel-bladed cutting board was used.

One half of the filter was placed in a plastic petri dish and sent by hand-delivery to XRAL for analysis. The remaining half was again sectioned into halves. One of the remaining quarters was used for sulphate and nitrate analysis by Concord Scientific and the last quarter was set aside to be archived or submitted later for quality assurance analysis.

XRAL subjected the filter half which they received to aqua regia digestion (with sonication). The solution extract was then split for DCP and FAA analysis, as indicated above.

The aliquot destined for $SO_4^=$ and NO_3^- analysis was leached with de-ionized water in a polyethylene bottle, shaken mechanically for 30 minutes. Concentrations of these ions were determined on a Dionex Model 10 Ion Chromatograph by an established procedure.

The analytical detection limits for the elements and ionic species may be found described in detail in section 4.7.2 of Appendix II. In brief, the limits of detection are as follows.

The limits of detection are assumed to be the same for the field survey samples as for the test field samples analyzed during the comparative study described in Appendix II, although different sampling media were used in the two parts of the program. Ghia Zeflour Teflon filters were used in the comparative study and Ghia Tefiueb Teflon filters in the seven-city survey. The blank values for the parameters of interest are assumed to be similar, for the analytical methods used here. For arsenic the estimated limit of detection is 0.02 μg/filter. Given an air sampling volume of 20 m^3 and a Zeflour blank of 0.08 μg/filter the operational limit is about 8 ng/m^3. The detection limit for cadmium is 0.2 μg/filter with an operational minimum of 10 to 20 ng/m^3. For chromium the limit of detection is 0.02 μg/filter which is about half the value of a Zeflour blank. The minimum detectable air concentration is about 4 ng/m^3. The detection limit for lead is 0.2 μg/filter with an operational analysis limit of 20 ng/m^3. In the case of sulphate the limit of detection is 6 μg/filter corresponding to a limit of 0.3 $μg/m^3$.

Based on accumulating evidence (6), it was mutually agreed by Concord Scientific and the EPS Scientific Authority, about half way through the study, that nitrate analysis should be terminated. Various investigators had reported evidence that an appreciable portion of airborne particulate nitrate - largely in the form of ammonium nitrate - is likely lost from teflon filters because of the lability of NH_4NO_3. Special techniques are required to collect particulate nitrate.

2.5 Quality Control

The analytical comparative study which preceded the selection of analytical methods included analyses of standard filters and air particulates by the participating laboratories. The accuracy and precision achieved by a laboratory in this part of the study was taken as an indication of the accuracy and precision to be expected in the analysis of the dichotomous sampler filters.

During the course of the analysis of the dichotomous sampler filters, about 12% of the archived quarter aliquots were submitted as blind re-tests.

As mentioned above, several inter-laboratory comparisons of the determination of filter weight were carried out during the course of the study. The results of these studies allow estimates to be made of the reproducibility and limits of uncertainty of the determination of mass loading of individual filters (absolute weighing accuracy and precision) and airborne particle concentration (relative weighing accuracy and precision of two consecutive weighings - tare and loaded).

Mention has been made above of the side-by-side, control sampler collections that were made to test sampler-to-sampler reproducibility.

All of these quality control results are presented in sections 3.1.3 and 3.2.3 and discussed in section 5.

2.6 Data Handling

Raw sampling, gravimetric and chemical analysis data for the experimental samplers at each site and for the additional curbside samplers at the Ottawa and Toronto sites were stored on magnetic disc on a Digital Electronics Corp. LSI/11 computer.

The basic computed output data are expressed in terms of coarse and fine fraction mass and elemental concentrations, by sampling site and NAPS sampling period, as shown in the tables of Appendix I .

Statistical analysis of these data and of the corresponding NAPS HiVol TSP and chemical composition data shown in Appendix IV were carried out as described in chapter 4. The output of this analysis is primarily linear regression statistics calculated to illuminate the relationship between components of the dichotomous sampler samples (mass, chemical composition) and corresponding HiVol sample parameters.

2.7 Special Studies

A very important component of the total study was the rooftop/curbside comparison in Ottawa and Toronto. Although all of the components sought in the larger study were determined in the special curbside collections, the major interest from the point of view of EPS was the relationship between curbside and rooftop airborne lead concentrations. The objective was to estimate whether there is a difference in exposure to lead (and other vehicle generated emissions) that a person at street level might experience relative to that determined from measurements at typical NAPS station sampler locations. Because of the predominance of lead in the fine particle size fraction, it is not obvious what relationship might exist between its concentration and distance from the street and height above the street. Similar statements could be made about measurements of sulphate in this special study, because sulphate also predominates in the fine particle fraction.

Results of the rooftop/curbside comparison study are presented in section 3.3.

2.8 Supplementary Data

The experimental survey dichotomous samplers were run simultaneously with the regular NAPS network instrumentation at each site. This set of instruments included a HiVol sampler, and thus, TSP and chemical composition data (As, Cd, Cr, Pb, $SO_4^=$, NO_3^-) for HiVol filters are available for comparison with analogous dichotomous sampler sample parameters. These data were supplied to Concord Scientific by EPS and were analyzed as described in section 2.6 above. Additional chemical analyses were performed by the EPS/Air Pollution Control Directorate Chemistry Division Laboratories for components of organic solvent extracts of a small subset of the dichotomous sampler filters. The extracts were analyzed primarily for polycyclic aromatic hydrocarbons. These results are tabulated in section 3.2.1.

2.9 Sampling Schedule

The survey began on September 18, 1980 (NAPS sampling period number 44) and was completed on January 28, 1981 (NAPS sampling period number 5). Dichotomous samplers were operated at all stations for all NAPS sampling periods during this time with few exceptions.

The rooftop/curbside comparative study began in Ottawa and Toronto on October 9 and ran through November 29, 1980 on a three-day cycle rather than the normal six-day NAPS sampling cycle. Thus, this special survey occurred alternately on normal NAPS sampling days and mid-way between them for about two months (18 sampling days).

3.0 STUDY RESULTS

3.1 Gravimetric Determination of Mass Loading

3.1.1 General

The methods employed for the determination of the mass loadings have been described in Section 2 of this report. A detailed analysis of the data was conducted using the Statistical Analysis System available through the York-Ryerson Computer Centre in Toronto.

The discussion in this section is primarily confined to station means and deviations. The correlation of mass to elemental and ionic concentrations has been examined and the results are presented in Section 3.2. In an attempt to determine a seasonal variant in the particulate loadings the study period has been divided into two seasons, fall, which covers September, October and November, and winter, which includes December and January.

It should be mentioned at this point that the results from the Ottawa rooftop, Ottawa curbside and Edmonton stations may be somewhat suspect. This is a result of calibration problems that resulted in the samplers being run at other than the intended flow rates of 15 l.p.m. fine and 1.67 l.p.m. coarse. Since the size fraction is dependent on the flowrate this will have affected the results from these samplers. The degree of deviation is not known but some indication of the magnitude of error may be obtained when the control sampler results are examined (see Section 3.3.3).

3.1.2 Station-by-Station Summary

The mean mass concentrations and associated standard deviations are presented in Table 1. The ratios of fine to coarse, fine to total and coarse to total were calculated and the means from these calculations are contained in Table 2.

When the sampling data for all seven cities, for both the fall and winter sampling periods, is grouped together the mass is fairly evenly divided between the fine and coarse fractions. Forty-nine per cent is observed in the fine fraction and fifty-one per cent in the coarse. Unfortunately this gives a misleading impression of uniformity in the data by smoothing out some large variations. In actual fact the data appears to be strongly dependent on the city and season. Grouping the data together by cities is useful to illustrate seasonal trends however.

The most obvious seasonal trend is an increase in the percentage of fine particles in the sampled mass during the winter sampling period. This occurs at all stations except Toronto where the percentage of fine particles is about 50 per cent for both fall and winter. When the cities are grouped together the fine particles form an overall average of 56 per cent of the I P with Halifax, Montreal, Ottawa and Vancouver all being in the vicinity of 60 per cent. The range for the individual cities is from 48 to 63 per cent. In the fall fine particles form an overall average of 48 per cent of the mass with the individual sites ranging from 26 to 59 per cent.

TABLE 1. AVERAGE MASS LOADINGS ($\overline{M}$) = SITE-BY-SITE SUMMARY

$\overline{M}$ IS IN $\mu g/m^3$

	FALL						WINTER						SURVEY TOTALS					
	COARSE		FINE		TOTAL		COARSE		FINE		TOTAL		COARSE		FINE		TOTAL	
	$\overline{M}$	Std. Dev.	$\overline{M}$	Std. Dev.	$\overline{M}$	Std. Dev.	$\overline{M}$	Std. Dev.	$\overline{M}$	Std. Dev.	$\overline{M}$	Std. Dev.	$\overline{M}$	Std. Dev.	$\overline{M}$	Std. Dev.	$\overline{M}$	Std. Dev.
HALIFAX	16.0	5.2	16.8	4.6	32.8	7.3	20.1	7.4	29.0	8.8	49.2	14.8	17.7	6.4	21.7	8.9	39.3	13.4
MONTREAL	30.9	14.2	18.0	9.3	48.5	18.0	26.7	22.6	42.5	20.3	69.2	27.0	29.1	18.0	28.6	19.3	57.5	24.2
OTTAWA	17.7	8.0	17.0	6.8	34.7	11.9	16.7	11.0	28.8	15.7	45.6	25.0	17.4	8.9	20.7	11.6	38.1	17.4
TORONTO	17.8	6.8	18.6	9.8	36.3	15.3	29.8	10.1	30.4	12.0	60.2	9.3	21.7	9.7	22.4	11.8	44.0	17.6
WINNIPEG	35.8	17.4	13.5	4.8	49.3	19.5	23.4	10.0	21.9	10.8	45.3	18.1	30.4	15.6	17.2	8.8	47.6	18.6
EDMONTON	63.1	35.7	22.0	9.0	85.1	41.4	28.1	15.3	29.0	14.1	57.0	18.3	48.8	33.6	24.9	11.6	73.6	36.1
VANCOUVER	21.5	9.0	31.4	14.0	52.9	21.6	11.9	5.3	19.8	4.1	31.8	6.5	18.7	9.1	28.0	13.0	46.7	20.7

TABLE 2. MEAN MASS FRACTION RATIOS FINE : COARSE (F/C), FINE : TOTAL (F/T), COARSE : TOTAL (C/T)

	FALL			WINTER			SURVEY TOTAL		
	F/C	F/T	C/T	F/C	F/T	C/T	F/C	F/T	C/T
HALIFAX	1.05	0.51	0.49	1.44	0.59	0.41	1.23	0.55	0.45
MONTREAL	0.58	0.37	0.64	1.59	0.61	0.39	0.98	0.50	0.51
OTTAWA	0.97	0.49	0.51	1.72	0.63	0.37	1.19	0.54	0.46
TORONTO	1.04	0.51	0.49	1.02	0.50	0.50	1.03	0.51	0.49
WINNIPEG	0.38	0.27	0.73	0.94	0.48	0.52	0.57	0.36	0.64
EDMONTON	0.35	0.26	0.74	1.03	0.51	0.49	0.74	0.34	0.66
VANCOUVER	1.46	0.59	0.41	1.66	0.62	0.37	1.50	0.60	0.40

During the fall sampling period at Montreal, Winnipeg and Edmonton the concentration of coarse particles exceeds the concentration of fine particles by a large margin. Coarse particles form 64, 73 and 74 per cent of the sampled mass, respectively, for these three cities.

In the winter the I P concentration decreases at Winnipeg, Edmonton and Vancouver primarily due to a decrease in the coarse fraction. At Toronto and the other eastern cities the reverse relationship is observed. At these sites the I P concentration increases in the winter primarily due to increases in the fine fraction.

3.1.3 Quality Control

Several comparisons of gravimetric determinations were conducted during the course of the study to ascertain if systematic errors might be affecting the mass determinations. There were three two-way comparisons between Concord Scientific and the Ontario Ministry of the Environment. An additional two sets of data were generated in a three way comparison between C.S.C., M.O.E. and the Environmental Protection Service (E.P.S.).

The filter handling techniques employed by CSC have been previously described. At M.O.E. the filters were conditioned in a controlled humidity box (50% R.H.) and discharged with a low level Polonium source contained within the Cahn 24 Electrobalance used. E.P.S. handled the filters in much the same way using a Mettler Microgrammatic balance, which also contained a Polonium source. The data from these laboratory intercomparisons are presented in table 3 and the paired Student's t-test results are to be found in Table 4.

Upon examination of tables 3 and 4 a few points are readily apparent. Firstly, the differences between each pair of weighings, with the exception of the Set A, M.O.E. - E.P.S. pairs and the Set D pairs, are significantly different from zero. Secondly, with the exception of Set C, the CSC weight is the lowest in each intercomparison set, regardless of the order of weighing. Thirdly, most of the average differences between Concord and the other laboratories are of similar magnitude, averaging out to 52.5 μg when Set C is excluded. This would correspond to an average uncertainty of only ± 2.4 $\mu g/m^3$ in the fine fraction and ± 1.9 $\mu g/m^3$ in the coarse fraction. The range of uncertainty is ± 1.39 to 3.60 $\mu g/m^3$ for the fine fraction and ± 1.11 to 2.88 $\mu g/m^3$ for the coarse fraction.

Since Set E consisted of blank filters it is not unreasonable to assume the same systematic difference is present both when the filters are tared and when the exposed weight is determined. If this is the case the net effect of the systematic difference would be very close to zero. A drawback to this assumption is the anomalous results in Set C. for which there is no ready explanation.

It is possible that the reason for the difference between CSC and the other laboratories is that the corona discharge eliminates static more efficiently than does the low level Polonium source. The reduced static charge would tend to reduce the weight determined by the balance. In part 3 of Table 5 it is readily apparent that discharging the exposed filters has an appreciable affect on the determined weight. This observation is consistent with previous experience and experience elsewhere.

Several field blanks were accumulated over the course of the study and the results from these are tabulated in Appendix III. No attempt was made to segregate the results into fine and coarse because in most cases the blanks were never actually inserted into the sampler. Using the survey means from the end of the appendix and a sample volume of 20 m^3 the average expected blank values were calculated as follows:

Mass - 5.9 $\mu g/m^3$
Sulphate - <0.3 $\mu g/m^3$
Arsenic - <0.01 $\mu g/m^3$
Cadmium - <0.04 $\mu g/m^3$
Lead - <0.045 $\mu g/m^3$
Chromium - <0.007 $\mu g/m^3$

With the exception of mass these are all very low values.

Table 3: Quality Control Gravimetric Pairs

Weights in ug

	Set A - Exposed Filters		
Order of Weighing	2nd	1st	3rd
Filter	E.P.S.	MOE	CSC
STD A	84800	84794	84775
STD B	94155	94153	94100
502F	55100	55110	55034
506F	54535	54536	54455
510F	53900	53935	53855
518F	54870	54868	54825
519C	54725	54757	54671
522F	93985	94008	93921
523C	93250	93266	93209
527C	99495	99478	99410
528F	97100	97111	97021
529C	94345	94320	94270
530F	90120	90164	90106
533C	90665	90670	90660
538F	89800	89731	89700

	Set B - Exposed Filters		
Order of Weighing	1st	2nd	3rd
Filter	E.P.S.	CONCORD	MOE
58F	86205	86149	86151
58C	88750	88659	88722
59F	86490	86345	86397
59C	96645	96576	96625
60C	94860	94810	94823
61F	98020	97900	97964
61C	95730	95654	95703
119F	93240	93152	93204
119C	92425	92381	92378
120F	86845	86769	86789
120C	96565	96454	96507
BLK F	88210	88130	88191
BLK C	87725	87629	87709
Control C	95605	95550	95622
Control F	91210	91200	91199

Set C - Exposed Filters

Order of Weighing	1st	2nd
Filter	CSC	MOE
Dec 26 C	92720	92563
Dec 26 F	94274	94094
Jan 1 C	91625	91449
Jan 1 F	92940	92773
Jan 7 C	84370	84226
Jan 7 F	90610	90441
Jan 13 C	89705	89583
Jan 13 F	93815	83650
Jan 19 C	90600	90418
Jan 19 F	86385	86233
Jan 25 C	90430	90242
Jan 25 F	97915	97776

Set D - Exposed Filters

Order of Weighing	1st	2nd
Filter	MOE	CSC
325	99838	99750
332	96779	96750
331	95260	95237
349	96814	96828
337	95767	95325
348	84745	84729
345	89164	89125
350	85331	85285
330	94200	94225
344	93700	93700
335	97784	97745
327	90823	90834
340	87104	87054
333	97779	97730
341	83477	83500

Set E - Blank Filters

Order of Weighing Filter	1st CSC µg	2nd MOE µg
S5	85726	85780
S12	93569	93597
S6	83800	83837
S15	83806	83704
S10	86310	86353
S3	83850	83899
S16	86642	86697
S18	90420	84750
S17	90230	90229
S8	84716	84750
S9	92315	92372
S19	92015	92140
S20	85904	85960
S4	86300	86331
S7	84234	84254
S1	86456	86492
S11	90655	90661
S14	91500	91490
S13	93613	93628
S2	91275	91313

- the pair of values for filter S18 has been discarded as an outlier.

Table 4: Paired t-Tests On The Difference Between Laboratory Weighings

	$\lvert\bar{\Delta}\rvert$	S_{Δ}	$S_{\bar{\Delta}}$	Degrees of Freedom	$t_{.01}$	t_{exp}	Significant
Set A							
Concord-MOE	59.3μg	25.3μg	6.5μg	14	2.98	<9.1	Yes
APTC-MOE	3.7	27.7	7.2	14	2.98	>0.5	No
Concord-EPS	55.5	27.0	7.0	14	2.98	<7.9	Yes
Set B							
Concord-MOE	42.3	27.0	7.0	14	2.98	<6.0	Yes
APTC-MOE	36.1	26.1	6.7	14	2.98	<5.4	Yes
Concord-EPS	77.8	33.4	8.6	14	2.98	<9.0	Yes
Set C							
Concord-MOE	162.0	20.0	6.0	11	3.11	<27	Yes
Set D							
Concord-MOE	49.9	113.0	29.2	14	2.98	>1.71	No
Set E							
Concord-MOE	30.1	43.0	9.86	18	2.88	<3.05	Yes

* at $t_{.01,14} = 2.98$ the mean difference, $\bar{\Delta}$, is significantly different from zero at P=0.99, if $t_{exp} \geq 2.98$

$\bar{\Delta}$ = Mean Difference

S_{Δ} = Standard Deviation of the Sample

$S_{\bar{\Delta}}$ = Standard Deviation of the Mean = $S_{\Delta}/\sqrt{n}$

n = Number of Sample Values

t_{exp} = t Value Calculated From Sample = $\lvert\bar{\Delta}\rvert/S_{\bar{\Delta}}$

Several small sub-studies were run to determine the effects of some of the handling procedures on the mass determinations. The results of these are in Table 5. There is insufficient data in any one of these studies to allow other than general observations. The repeat weighings in this table were useful in providing an estimate of ± 12.3 μg/filter uncertainty in the weighing of a filter. This is considered to be excellent precision. It appears from parts 2 and 3 of Table 5 that discharging the static on a filter has a greater affect on exposed filters than blank filters.

The tip-proof shipping box with an affixed Tip-n-Tell gauge was designed to minimize rough handling on the part of the public carriers used. According to the Tip-n-Tell gauges approximately one half of the boxes were tipped in trasit to CSC. For this reason the design of the shipping container cannot be considered a success. In view of this,a very brief study was conducted to determine the affect of capping or covering the exposed filters to prevent loss from the mass loading. The cap consisted of a teflon disc that just covered the exposed area of the filter. The disc

TABLE 5: GRAVIMETRIC SUB-STUDIES

1. Conditioning

	Initial Wt.(μg)	Final Wt.(μg)	Δ(μg)
Blank 1	87905	87945	40
Blank 2	91454	91590	136
Blank 3	88420	88458	38

- filters were conditioned 24 hrs. between weighings.

2. Discharging

Filter	Initial Wt.(μg)	Final Wt.(μg)	$\overline{\Delta}$(μg)
584	95016	94987	+ 1
	94960		
648	88735	88720	
	88740	88725	-15
507	87756	86775	
	87760	86775	+17
497	93135	93100	-30
	93125		

- blank unconditioned filters.

3. Discharging

Filter	Initial Wt.(μg)	Final Wt.(μg)	$\overline{\Delta}$(μg)
222	88904	88817	
		88817	
		88817	-87
246	94562	94545	-17
233	88471	88446	
		88430	
		88455	
		88434	
		88475	-23
226	94010	92800	
		92800	
		92805	-1208
235	93238	90641	-2597

3. Discharging - Cont'd

Filter	Initial Wt.(µg)	Final Wt.(µg)	$\bar{\Delta}$(µg)
229	90216	90154	- 62
238	86941	86828 86834 86831	-110

- exposed conditioned filters

- aver. Δ = 20.6 µg/filter on Filter weighed under indentical conditions in parts 2 & 3.

4. Cover Test - data on exposed filters from survey and control samplers, samplers running simultaneously and side-by-side.

DATE	WITHOUT COVER		WITH COVER	
	FILTER	Δ MASS (µg)	FILTER	Δ MASS (µg)
DEC 9	C 591 F 592	620 500	C 694 F 645	696 354
DEC 13	C 595 F 596	326 576	C 642 F 643	352 686
DEC 19	C 599 F 600	570 751	C 646 F 647	482 526

was backed with a piece of urethanefoam to hold it in place when the petri dishes were covered. The results of this study are in Table 5, part 4. The data were obtained by running two samplers simultaneously and side-by-side. Unfortunately it is impossible to draw any conclusions from the small data set.

3.2 Elemental and Ionic Particulate Concentration

3.2.1 General

As described earlier, analysis for nitrate, sulphate, arsenic cadmium, chromium and lead were undertaken. Because the nitrate analysis were terminated partway through the study and all of the cadmium values were below the detection limit no data analysis has been done for these two species. In cases where calculations were undertaken with a value below the detection limit a value equal to one half of the detection limit was used.

When a given parameter had both the fine and coarse fractions less than the detection limit for a given date and location it was discarded. The procedure introduces a small bias toward higher mean values in a few cases, which is judged to be not significant. Similarily if the value of a parameter for a given date and location was missing for either of the coarse or fine fractions the existing value and corresponding total value were discarded to prevent the use of misleading total values.

Ratios of fine to coarse, fine to total and coarse to total were calculated from the raw data and then means were calculated from these individual ratios.

It will be noted that in some places in Tables 6 - 9 that the sum of the fine and coarse means does not always exactly equal the total value shown. Similarily in Tables 10 - 13 the sum of the ratios of fine to total and coarse to total will not always equal exactly 100 per cent. This is due to marginal error introduced by rounding the numbers at varying stages during the calculations. This has not introduced any significant error.

3.2.2 Station-by-Station Summary

The mean values for each station and the associated standard deviations are presented in Table 6 - 9, both by season and for the overall survey period. The ratios of fine to coarse, fine to total and coarse to total are presented in Tables 10 - 13, also by season and for the total survey period.

Each of the four species examined arsenic, chromium, lead and sulphate predominated in the fine fraction, in a majority of cases. This is most pronounced for lead and sulphate. In the winter from 63 to 83 per cent of the lead was in the fine fraction and in the fall 68 to 79 per cent was in the fine fraction. For sulphate, in the winter, 69 to 90 per cent was found the fine fraction and in the fall 68 to 92 per cent was in the fine fraction.

TABLE 6: AVERAGE ARSENIC ($\overline{As}$) CONCENTRATIONS - SITE-BY-SITE SUMMARY

$\overline{As}$ in ng/m^3

N/A = not available

	SURVEY TOTALS						FALL						WINTER					
	COARSE		FINE		TOTAL		COARSE		FINE		TOTAL		COARSE		FINE		TOTAL	
	$\overline{As}$	Std. Dev.	$\overline{As}$	Std. Dev.	$\overline{As}$	Std. Dev.	$\overline{As}$	Std. Dev.	$\overline{As}$	Std. Dev.	$\overline{As}$	Std. Dev.	$\overline{As}$	Std. Dev.	$\overline{As}$	Std. Dev.	$\overline{As}$	Std. Dev.
HALIFAX	6.27	2.00	6.13	2.37	12.40	3.67	6.27	2.00	6.13	2.38	12.40	3.67	N/A	N/A	N/A	N/A	N/A	N/A
MONTREAL	4.18	1.93	5.46	2.28	9.64	3.94	4.67	1.92	5.60	2.60	10.27	4.31	2.48	0.25	4.95	0.49	7.43	0.74
OTTAWA	3.10	1.72	5.09	3.14	8.19	3.73	3.35	1.83	4.50	1.74	7.85	3.01	2.02	0.16	7.67	6.61	9.70	6.76
TORONTO	3.04	1.50	5.76	2.35	8.78	3.47	3.24	1.65	6.08	2.58	9.29	3.78	2.30	N/A	4.60	N/A	6.90	N/A
WINNIPEG	13.70	37.80	5.42	4.02	19.11	41.50	18.03	44.61	5.97	4.66	23.98	48.94	2.89	1.14	4.05	1.17	6.94	0.08
EDMONTON	4.25	1.37	3.48	1.11	7.74	0.97	4.25	1.37	3.48	1.11	7.74	0.97	N/A	N/A	N/A	N/A	N/A	N/A
VANCOUVER	4.50	2.22	6.03	2.85	10.53	3.32	4.69	2.25	5.27	1.41	9.96	2.86	2.70	N/A	13.60	N/A	16.30	N/A

TABLE 7: AVERAGE CHROMIUM ($\overline{Cr}$) CONCENTRATIONS - SITE-BY-SITE SUMMARY

$\overline{Cr}$ in ng/m^3

	SURVEY TOTALS						FALL						WINTER					
	COARSE		FINE		TOTAL		COARSE		FINE		TOTAL		COARSE		FINE		TOTAL	
	$\overline{Cr}$	Std. Dev.	$\overline{Cr}$	Std. Dev.	$\overline{Cr}$	Std. Dev.	$\overline{Cr}$	Std. Dev.	$\overline{Cr}$	Std. Dev.	$\overline{Cr}$	Std. Dev.	$\overline{Cr}$	Std. Dev.	$\overline{Cr}$	Std. Dev.	$\overline{Cr}$	Std. Dev.
HALIFAX	3.93	3.28	6.20	4.84	10.10	5.48	2.18	2.35	6.00	5.73	8.15	5.31	6.04	3.12	6.44	4.19	12.44	5.24
MONTREAL	9.86	10.21	13.58	11.89	23.45	20.78	14.23	11.15	16.44	14.69	30.68	24.28	3.63	3.86	9.50	4.54	13.11	7.43
OTTAWA	4.44	2.25	5.61	4.03	9.55	5.10	4.74	2.29	6.79	3.92	10.84	4.99	3.67	2.14	2.52	2.40	6.20	3.91
TORONTO	7.27	4.98	7.58	4.66	14.85	8.01	7.86	5.36	7.49	4.01	15.34	7.43	5.98	3.99	7.78	6.21	13.74	9.65
WINNIPEG	6.63	7.98	8.27	11.56	14.91	11.93	6.72	10.28	12.85	14.46	19.57	14.58	6.52	4.95	3.12	3.00	9.66	4.76
EDMONTON	12.64	8.61	11.29	9.62	23.94	17.02	14.95	10.17	13.20	11.04	28.15	19.75	8.69	1.88	8.01	5.88	16.71	7.56
VANCOUVER	5.71	4.09	18.64	17.38	24.36	16.39	4.12	3.33	23.07	19.41	27.17	19.10	9.30	3.54	8.68	3.55	18.03	4.93

TABLE 8: AVERAGE LEAD ($\overline{Pb}$) CONCENTRATIONS - SITE-BY-SITE SUMMARY

$\overline{Pb}$ in ng/m^3

	SURVEY TOTALS						FALL						WINTER					
	COARSE		FINE		TOTAL		COARSE		FINE		TOTAL		COARSE		FINE		TOTAL	
	$\overline{Pb}$	Std. Dev.	$\overline{Pb}$	Std. Dev.	$\overline{Pb}$	Std. Dev.	$\overline{Pb}$	Std. Dev.	$\overline{Pb}$	Std. Dev.	$\overline{Pb}$	Std. Dev.	$\overline{Pb}$	Std. Dev.	$\overline{Pb}$	Std. Dev.	$\overline{Pb}$	Std. Dev.
HALIFAX	66.7	30.1	174.1	81.3	240.8	91.75	57.8	28.8	155.3	62.9	213.1	74.3	80.1	29.2	202.2	103.0	282.3	106.3
MONTREAL	188.8	99.1	676.5	235.3	865.3	269.5	192.9	107.1	658.1	255.0	850.0	291.2	182.4	86.6	705.5	216.4	887.8	252.1
OTTAWA	137.9	84.9	401.8	157.0	537.7	188.4	142.5	98.0	387.9	166.8	530.4	204.1	125.8	34.2	438.3	130.4	556.6	149.4
TORONTO	87.1	71.5	290.0	133.9	377.0	145.2	98.1	82.0	280.8	151.1	378.9	166.0	63.8	35.6	309.2	92.3	373.1	95.7
WINNIPEG	149.0	87.3	314.6	171.6	477.9	248.5	137.1	95.1	295.0	158.4	432.0	240.1	164.9	78.3	340.8	194.3	540.0	260.3
EDMONTON	189.1	75.7	556.3	290.1	745.4	356.0	181.8	84.3	560.3	317.6	742.1	392.2	200.0	64.4	550.4	264.2	750.4	319.7
VANCOUVER	184.0	95.4	693.3	365.3	877.3	446.0	210.9	96.7	805.8	354.7	1016.7	430.8	109.9	36.6	384.1	171.5	494.0	206.5

TABLE 9: AVERAGE SULPHATE ($\overline{SO}_4$) CONCENTRATION: SITE-BY-SITE SUMMARY

$\overline{SO}_4$ in $\mu g/m^3$

	SURVEY TOTALS						FALL						WINTER					
	COARSE		FINE		TOTAL		COARSE		FINE		TOTAL		COARSE		FINE		TOTAL	
	SO_4	Std. Dev.	SO_4	Std. Dev.	SO_4	Std. Dev.	SO_4	Std. Dev.	SO_4	Std. Dev.	SO_4	Std. Dev.	SO_4	Std. Dev.	SO_4	Std. Dev.	SO_4	Std. Dev.
HALIFAX	.553	.467	5.81	3.02	6.46	3.01	.750	.524	4.31	2.70	5.06	2.70	.292	.196	7.82	2.25	8.70	2.05
MONTREAL	.636	.544	4.94	3.45	5.58	3.48	.365	.167	3.25	1.77	3.64	1.77	.975	.669	7.04	3.96	8.02	3.64
OTTAWA	.563	.512	3.24	2.66	3.80	2.91	.438	.351	2.11	1.53	2.55	1.65	.875	.721	6.08	2.84	6.94	3.07
TORONTO	.404	.300	4.13	3.25	4.53	3.39	.344	.246	3.86	3.70	4.20	3.86	.525	.377	4.66	2.18	5.20	2.23
WINNIPEG	.859	.494	2.25	1.70	3.10	1.87	.733	.480	1.56	0.82	2.28	1.10	1.00	.501	3.03	2.13	4.03	2.17
EDMONTON	.735	.470	2.11	1.88	2.84	1.99	.589	.429	2.22	2.37	2.80	2.47	.900	.487	1.99	1.29	2.89	1.44
VANCOUVER	1.08	.841	3.51	2.33	4.57	2.64	1.19	.920	3.95	2.58	5.13	2.88	.775	.556	2.28	0.61	3.03	0.79

TABLE 10: MEAN FRACTION RATIOS FOR ARSENIC   FINE : COARSE (F/C), FINE : TOTAL (F/T), COARSE : TOTAL (C/T)

N/A = not available

	SURVEY TOTAL			FALL			WINTER		
	F/C	F/T	C/T	F/C	F/T	C/T	F/C	F/T	C/T
HALIFAX	0.98	0.49	0.51	0.97	0.49	0.51	N/A	N/A	N/A
MONTREAL	1.31	0.57	0.43	1.20	0.55	0.45	2.00	0.67	0.33
OTTAWA	1.67	0.62	0.38	1.34	0.57	0.43	3.80	0.79	0.21
TORONTO	1.89	0.66	0.35	1.88	0.65	0.35	2.00	0.67	0.33
WINNIPEG	0.40	0.28	0.72	0.33	0.25	0.75	1.40	0.58	0.42
EDMONTON	0.82	0.45	0.56	0.82	0.45	0.55	N/A	N/A	N/A
VANCOUVER	1.34	0.57	0.43	1.12	0.53	0.47	5.04	0.83	0.17

TABLE 11: MEAN FRACTION RATIOS FOR CHROMIUM FINE : COARSE (F/C), FINE : TOTAL (F/T), COARSE : TOTAL (C/T)

	SURVEY TOTAL			FALL			WINTER		
	F/C	F/T	C/T	F/C	F/T	C/T	F/C	F/T	C/T
HALIFAX	1.58	0.61	0.39	2.75	0.74	0.27	1.07	0.52	0.49
MONTREAL	1.38	0.58	0.42	1.16	0.54	0.46	2.61	0.72	0.28
OTTAWA	1.26	0.59	0.46	1.43	0.63	0.44	0.67	0.41	0.59
TORONTO	1.04	0.51	0.49	0.95	0.49	0.51	1.30	0.57	0.44
WINNIPEG	1.25	0.55	0.44	1.91	0.66	0.34	0.48	0.32	0.67
EDMONTON	0.89	0.47	0.52	0.88	0.47	0.53	0.92	0.48	0.52
VANCOUVER	[illegible]	.77	.2	.6	[illegible]	.1	.93	.48	0.52

TABLE 12: MEAN FRACTION RATIOS FOR LEAD   FINE : COARSE (F/C), FINE : TOTAL (F/T), COARSE : TOTAL (C/T)

	SURVEY TOTAL			FALL			WINTER		
	F/C	F/T	C/T	F/C	F/T	C/T	F/C	F/T	C/T
HALIFAX	2.61	0.72	0.28	2.69	0.73	0.27	2.52	0.72	0.28
MONTREAL	3.58	0.78	0.22	3.41	0.77	0.23	3.87	0.79	0.21
OTTAWA	2.91	0.75	0.26	2.72	0.73	0.27	3.48	0.79	0.23
TORONTO	3.33	0.77	0.23	2.86	0.74	0.26	4.85	0.83	0.17
WINNIPEG	2.11	0.66	0.31	2.15	0.68	0.32	2.07	0.63	0.31
EDMONTON	2.94	0.75	0.25	3.08	0.76	0.24	2.75	0.73	0.27
VANCOUVER	3.77	0.79	0.21	3.82	0.79	0.21	3.49	0.78	0.22

TABLE 13: MEAN FRACTION RATIOS FOR SULPHATE FINE : COARSE (F/C), FINE : TOTAL (F/T), COARSE TO TOTAL (C/T)

	SURVEY TOTAL			FALL			WINTER		
	F/C	F/T	C/T	F/C	F/T	C/T	F/C	F/T	C/T
HALIFAX	10.51	0.90	0.09	5.75	0.85	0.15	26.78	0.90	0.03
MONTREAL	7.77	0.89	0.11	8.90	0.89	0.10	7.22	0.88	0.12
OTTAWA	5.75	0.85	0.15	4.82	0.83	0.17	6.95	0.88	0.13
TORONTO	10.22	0.91	0.09	11.22	0.92	0.08	8.88	0.90	0.10
WINNIPEG	2.62	0.73	0.28	2.13	0.68	0.32	3.03	0.75	0.25
EDMONTON	2.87	0.74	0.26	3.77	0.79	0.21	2.21	0.69	0.31
VANCOUVER	3.25	0.77	0.24	3.32	0.77	0.23	2.94	0.75	0.26

With the exception of Vancouver, where winter lead concentrations were only half of those observed in the fall, lead concentrations were basically independent of season, remaining fairly constant. At each city the distribution of lead between the fine and coarse fractions did not exhibit much change over the coarse of the survey. All stations except Vancouver showed an increase in the total concentration of sulphate during the winter sampling period. The percentage of sulphate in each fraction was fairly constant over the entire survey period at each site.

With the exception of Halifax, Winnipeg and Edmonton, more arsenic is found in the fine fraction than in the coarse fraction. This tendency was somewhat more pronounced in the winter than in the fall. The concentration of arsenic in the coarse fraction was lower in the winter than in the fall.

In the fall, chromium was present in higher concentration in the fine fraction for all stations except Toronto and Edmonton. In the winter, only Halifax, Montreal and Toronto showed more than 50 per cent of the chromium in the fine fraction. For all stations except Halifax the total concentration of chromium decreased during the winter sampling period.

Linear correlation matrices were generated for the dichotomous sampler data and many of these are reproduced in Appendix VI. The only consistent by significent correlation observed (variable from season to season and from city to city) was between the fine mass concentrations and the fine concentrations of lead and sulphate. These data have been reproduced in Table 14.

TABLE 14: CORRELATION OF FINE MASS CONCENTRATION TO FINE SULPHATE AND LEAD CONCENTRATIONS

	SURVEY TOTAL		FALL		WINTER	
Mass Fine To	SO_4 Fine	Pb Fine	SO_4 Fine	Pb Fine	SO_4 Fine	Pb Fine
HALIFAX	.679/.008	.605/.017	.587/.126	.603/.085	.437/.386	.615/.194
MONTREAL	.232/.354	.576/.012	-.026/.942	.792/.004	-.256/.541	.761/.047
OTTAWA	.679/.0001	.349/.063	.373/.105	.388/.083	.624/.099	.161/.704
TORONTO	.748/.0001	.523/.004	.762/.0006	.645/.003	.927/.001	.203/.600
WINNIPEG	.381/.132	.653/.001	.028/.943	.235/.463	-.021/.960	.214/.580
EDMONTON	.044/.866	.446/.049	.198/.610	.851/.001	-.143/.735	.021/.961
VANCOUVER	.806/.0003	.887/.0001	.797/.003	.873/.001	.797/.003	.873/.001

* First number is correlation factor, Second number is probability of null hypothesis.

3.2.3 Quality Control

The quality control data for sulphate, lead and arsenic are presented in Tables 15 and 16. The reproducibility of the sulphate analysis is excellent. The t-test calculation in Table 15 indicates that the mean difference between the sulphate pairs is not statistically different from zero.

The t-test for the lead quality control data indicates that the mean difference between the analyzed pairs is statistically greater than zero. The average difference of 1.9 μg corresponds to an uncertainty of 100 ng/m^3. While this ranges from 50 to greater than 100 per cent of the observed mass in the coarse fraction, the effect upon the fine fraction, where lead predominates, is less severe (14 to 57%; mean 17%). It should be emphasized that while this precision is not as good as was observed in the comparative study (Appendix II) only half of each filter was analyzed; whereas, the entire filter was analyzed for the comparative study. The relative variation in the field study repeat analysis was 18 per cent, compared with a predicted precision of ± 10% based on the laboratory study, which should not be considered unreasonable in view of the small quantities of material involved.

Almost all of the quality control results for arsenic are at or below the detection limits, therefore, no mathematical analysis was done. Unfortunately due to unforeseen laboratory problems, most of the quality control data were not generated for chromium. The available data comprise too small a sample to be statistically meaningful and are not included here.

TABLE 15. SULPHATE QUALITY CONTROL DATA IN μg/filter

FILTER	1ST ANALYSIS	2ND ANALYSIS
252	143.2	132.8
414	76.0	49.6
462	< 2.6	4.4
469	61.6	57.6
734	97.5	84.8
462	< 2.6	16.0
500	110.0	192.0
590	126.4	118.4
551	14.7	30.0
647	192.0	210.4
683	< 2.6	< 2.6
348	67.2	52.8
597	17.2	10.8
624	9.0	< 2.6
514	96.8	66.4
625	9.0	< 2.6
626	9.0	17.6
628	6.5	8.8
629	9.0	20.0
590	126.4	126.4
500	110.0	130.4
708	< 2.6	< 2.6
318	< 2.6	< 2.6
593	< 2.6	< 2.6
601	112.8	100.4
434	< 2.6	25.6
456	< 2.6	4.0
644	12.8	12.8
736	182.9	181.6
737	42.0	35.0
708	< 2.6	4.8
605	< 2.6	< 2.6

average difference $\overline{\Delta} = -1.7$ $S_{\overline{\Delta}} = 18.9$ $S_{\overline{\Delta}} = 3.3$

t [illegible] = 2.755 > t_{exp} = .52

∴ the difference between the two data sets is not significant.

TABLE 16. QUALITY CONTROL DATA FOR LEAD AND ARSENIC IN µg/FILTER

	1st Analysis		2nd Analysis			1st Analysis		2nd Analysis	
FILTER	As	Pb	As	Pb	FILTER	As	Pb	As	Pb
414	.10	3.0	-	17.6	291	.20	10.8	.10	7.8
382	<.10	17.8	-	8.4	292	<.20	6.0	.10	2.6
352	.10	11.0	-	10.0	293	<.20	5.6	.10	3.8
208	.10	14.2	-	18.4	294	<.20	10.4	.10	7.4
248	<.10	16.0	.10	28.0	295	.60	23.6	.10	22.0
252	<.20	16.0	.10	15.8	296	<.20	8.0	.10	4.0
254	<.20	19.2	.10	11.8	298	<.20	10.8	.10	7.0
257	<.20	34.8	.10	34.0	299	<.20	20.0	<.10	18.0
259	<.20	18.8	.10	16.4	300	<.20	10.0	<.10	8.2
261	<.20	16.4	.10	11.6	301	.80	21.2	.10	16.4
264	<.20	16.0	.10	14.2	302	1.00	8.8	<.10	6.2
265	<.20	8.8	.10	7.2	303	<.20	24.4	<.10	22.0
266	<.20	4.0	.10	2.2	311	<.20	3.2	<.20	2.2
267	<.20	6.4	.10	4.6	312	<.20	2.4	.20	1.2
268	<.20	11.6	.10	5.2	317	<.20	5.2	.20	2.2
269	<.20	22.4	<.10	16.6	322	<.20	5.2	.10	3.0
270	<.20	11.2	.10	9.6	323	<.20	1.6	.10	1.6
271	<.20	26.8	.10	22.0	324	<.20	7.6	.20	5.8
272	<.20	10.8	.10	7.0	329	<.20	4.8	.10	2.6
273	<.20	15.2	.10	11.6	330	<.20	8.4	.10	6.0
279	.40	16.0	.40	15.0	331	<.20	2.4	<.10	1.2
284	.20	3.6	.10	3.0	332	<.20	4.8	<.10	3.4
288	.20	6.0	.10	2.8	351	<.20	6.8	.10	6.0
289	<.20	6.8	.10	4.0	353	<.20	7.2	.10	6.2
290	<.2	10.0	.10	5.0					

Lead t-test

average difference $\overline{\Delta} = 1.90$ $S_{\Delta} = 3.82$ $S_{\overline{\Delta}} = 0.55$

$t_{.01,48} = 2.68 < t_{exp} = 3.45$

∴the difference is significant

Arsenic t-test
- not done

3.3 Special Studies

3.3.1 Rooftop to Curbside Comparison

At two of the sampling sites, Toronto and Ottawa, an additional sampler was operated at a curbside location as close as possible to and running concurrently with the rooftop unit. The purpose of this was to determine the relationship between curbside and rooftop airborne lead concentrations.

At Ottawa both of the samplers were at the NAPS Slater St. location. The rooftop sampler was 17 m above and 30 m horizontally from the curbside unit corresponding to a slant height separation of 34 m. At Toronto only the rooftop sampler was at the College St. NAPS site as it proved impossible to obtain a curbside location in the area. The curbside unit was located about 335 m to the north at 880 Bay St. While this was not the ideal situation, Bay and College Streets have similar traffic flow patterns and volumes so the data obtained may be similar to what would have been obtained with the two samplers at the same location. The rooftop sampler at College Street was 19 m above the street and 30 m horizontally from the street, corresponding to a slant height of 36 m from the street. This figure is very close to that observed at Slater Street in Ottawa. The curbside sampler at Bay Street was about 5 m from the curb. Hivol samplers were also running at each of the curbside and rooftop locations. The mean data values for these samplers are presented in Table 17.

Traffic counters were operational at both sites during the course of the survey. Slater St., a one-way eastbound thoroughfare, recorded an average weekday traffic volume of 12,700 vehicles/day and an average weekend traffic volume of 5,800 vehicles/day. Bay St., a two-way north/south thoroughfare recorded an average weekday traffic volume of 24,900 vehicles/ day and average weekend traffic volume of 24,000 vehicles/day.

The mean data values for each sampler are presented in Table 17. Most of the mean sulphate values show a higher concentration at roof level than at curbside for both cities, the only exception being the fine fraction at Toronto. The fine fraction for mass for both cities also exhibits higher concentrations at roof level. All other measurements including those of the HiVol show lower concentrations at roof level.

To compare the rooftop and curbside data, linear correlation and regression analyses were done. The results of these may be found in Tables 18 and 19. It is difficult to compare the Toronto and Ottawa data. Not only does air sampling data tend to be city dependent but the location of the samplers relative to each other was different in each city.

For the dichotomous sampler data the coarse fraction resulted in the poorest correlation for each parameter, although the difference was not always large. The roof to curb correlations for HiVol lead and mass agree well with the corresponding I P correlations except for the Toronto HiVol mass which has a correlation coefficient which is less than half of the corresponding I P mass correlation coefficient.

TABLE 17: ROOFTOP/CURBSIDE STUDY DATA: MEAN VALUES

Δ = Curb-Roof

OTTAWA	DICHOTOMOUS CURBSIDE SAMPLER			Δ			DICHOTOMOUS ROOFTOP SAMPLER			HIVOL SAMPLERS		
	Fine	Coarse	Total	Fine	Course	Total	Fine	Coarse	Total	Curbside	Δ HiVol	Rooftop
Mass $\mu g/m^3$	19.3	20.2	39.4	-1.4	2.8	1.3	20.7	17.4	38.1	58.6	7.3	51.3
SO_4 $\mu g/m^3$	0.59	2.04	2.55	-0.07	-0.80	-0.86	.66	2.84	3.41	N/A	-	8.82
Pb ng/m^3	167	550	686	11	148	156	156	402	530	766	286	480
TORONTO												
Mass $\mu g/m^3$	20.1	27.4	47.4	-2.3	6.1	4.4	22.4	21.3	43.0	129.8	59.8	70
SO_4 $\mu g/m^3$	0.68	2.87	3.37	0.27	-0.43	-0.26	0.41	3.30	3.63	N/A	12.8	-
Pb ng/m^3	152	525	683	66	235	325	86	290	358	761	350	411

TABLE 18: ROOFTOP TO CURBSIDE CORRELATIONS/SIGNIFICANCES*

DICHOTOMOUS SAMPLER DATA

OTTAWA	MASS	SO_4	Pb
Fine	.864/.0001	.643/.010	.909/.0001
Coarse	.778/.0001	-.049/.863	.806/.0002
Total	.835/.0001	.600/.018	.910/.0001
TORONTO			
Fine	.936/.0001	.777/.003	.652/.006
Coarse	.536/.026	.156/.628	.464/.070
Total	.857/.0001	.810/.001	.602/.014

HIVOL SAMPLER DATA

OTTAWA	.845/.008	-	.953/.0002
TORONTO	.337/.375	-	.667/.050

* The significance is the probability of the null hypothesis and should be near 0.0000 for high significance.

TABLE 19: LINEAR REGRESSION ANALYSIS OF ROOFTOP TO CURBSIDE DATA

Dependent+ Variable	Independent Variable	Slope	Std. Error	P:Ho*	Intercept	Std. Error	P:Ho	R^2
MASS OTT	MASS OCT	.631	.104	.0001	10.73	4.43	.028	.697
MASS OTC	MASS OCC	.715	.139	.0001	3.58	3.10	.265	.621
MASS OTF	MASS OCF	.679	.099	.0001	4.50	2.09	.046	.746
SO_4 OTT	SO_4 OCT	.605	.224	.018	1.05	0.76	.19	.360
SO_4 OTC	SO_4 OCC	-.020	.111	.863	0.42	0.11	.002	.002
SO_4 OTF	SO_4 OCF	.604	.200	.020	1.06	0.56	.08	.413
Pb OTT	Pb OCT	.580	.070	.0001	145.7	52.1	.014	.829
Pb OTC	Pb OCC	.502	.098	.0002	49.2	17.1	.012	.650
Pb OTF	Pb OCF	.602	.074	.0001	96.7	41.9	.037	.827
MASS TOT	MASS TCT	.502	.079	.0001	10.16	4.26	.031	.732
MASS TOC	MASS TCC	.274	.112	.027	9.01	3.38	.018	.287
MASS TOF	MAS TCF	.671	.065	.0001	3.97	1.60	.026	.876
SO_4 TOT	SO_4 TCT	.835	.191	.001	-0.02	0.95	.984	.657
SO_4 TOC	SO_4 TCC	.066	.133	.628	0.28	0.13	.058	.024
SO_4 TOF	SO_4 TCF	.148	.230	.003	- .15	0.93	.877	.603
Pb TOT	Pb TCT	.232	.082	.014	170.8	60.9	.014	.363
Pb TOC	Pb TCC	.282	.144	.070	36.3	26.6	.193	.215
Pb TOF	Pb TCF	.343	.107	.006	68.0	60.4	.280	.424
MASS OTH	MASS OCH	.467	.121	.008	22.5	9.20	.050	.714
SO_4 OTH	SO_4 OCH	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pb OTH	Pb OCH	.641	.083	.0002	-.001	.077	.987	.908
MASS TOH	MASS TCH	.191	.202	.375	36.1	26.4	.279	.114
SO_4 TOH	SO_4 TCH	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pb TOH	Pb TCH	.462	.195	.050	-.034	.144	.819	.445

* Probability of the null hypothesis

\+ city code

OT- Ottawa rooftop
OC - Ottawa curbside
TO - Toronto rooftop
TC - Toronto curbside

Fraction Code

C dichotomous coarse fraction
F dichotomous fine fraction
T dichotomous total fraction
H HiVol

eg. TOC, Toronto rooftop, coarse fraction.

The roof to curb regression lines for lead, sulphate and mass at Ottawa all have similar slopes for the I P data, these being 0.580, 0.605 and 0.631 respectively. The corresponding HiVol data produce slopes of 0.467 for mass and 0.641 for lead. The associated R^2 coefficients are high for all but the I P sulphate line. Similar agreement is found in the fine fraction but not in the coarse fraction. No similar agreement is found amongst the Toronto data regression lines. This may be due to the placement of the rooftop and street level samplers at different sites in Toronto, as previously discussed.

The analysis of the Ottawa data indicates that there is a relationship between rooftop and street level samplers. Certainly more study is needed to confirm this. The relationship would be expected to depend heavily upon the location of the roof and curb samplers relative to each other.

The question of agreement between the two sampler types will be addressed in Section 4.

3.3.2 Organics

Fourteen of the dichotomous sampler filters, two from each site, were analyzed by Environment Canada for polycyclic aromatic hydrocarbons (PAH). The results of these analyses are presented in Table 20.

The filters were extracted with methylene chloride in pyrex soxhlet extractor tubes for twenty-four hours. Simultaneous extractions were performed for the glassware and filter blanks. The methylene chloride was removed to near dryness by rotary evaporation and the volume was made up to 100 μL with cyclohexane. Samples of 1 to 2 μL were used in a Perkin-Elmer Sigma 3 gas chromatograph with a temperature program beginning at 40°C and ending at 320°C with a rate of rise of 4°C/minute. Identification of the species was done by spiking the extracts with PAH standards Quantitation of the organics was by an external standard calibration method. The analyses were confirmed on a Finnigan model 4023 GC/MS.

There is insufficient data in the special study to permit any definitive statements but in general the observed concentrations are consistently higher than those observed in Hivol filters although they do not exceed individual maximum values. This could indicate that PAH is retained better on the teflon filters used in the dichotomous sampler but further study would be needed to confirm or refute this.

TABLE 20. Polycyclic Aromatic Hydrocarbons Found in the Dichotomous Filters

PAH Found (ng/m³)

Location	Filter #	Fluorene	Phenanthrene	Fluoranthene	Pyrene	Chrysene + Triphenylene	Benzo (a) pyrene
Halifax	416	ND	3.3	ND	ND	ND	ND
	548	ND	14.4	2.8	ND	3.1	10.1
Montreal	431	ND	ND	ND	ND	ND	ND
	565	0.4	ND	ND	2.0	ND	ND
Ottawa	492	ND	ND	ND	ND	ND	ND
	602	ND	3.6	ND	ND	4.2	9.0
Toronto	525	ND	7.2	ND	ND	ND	9.0
	583	ND	ND	ND	ND	ND	10.5
Winnipeg	443	ND	ND	ND	ND	ND	ND
	613	ND	14.3	5.7	ND	ND	8.2
Edmonton	455	ND	ND	ND	ND	ND	ND
	627	ND	ND	ND	ND	ND	ND
Vancouver	467	ND	ND	ND	ND	ND	10.5
	633	ND	ND	ND	ND	ND	ND

ND = Not Detected

3.3.3 Control Samplers

This study consisted of control samplers intended to check the reproducibility of the results from the study samplers. At Ottawa the control sampler ran next to and concurrently with the rooftop study sampler. At Toronto two separate dichotomous samplers were set up near the rooftop sampler but were not run on the NAPS schedule. The data from these two samplers can therefore only be offered as a general comment on dichotomous samplers and cannot be directly applied to the study results.

The data from the control samplers is presented in Tables 21 and 22 along with the paired t-test calculations. The Toronto samplers give good agreement and the t-test indicates that the difference between the two is not significant. The t-test for the Ottawa data show a significant difference for the course fraction only and the reason for this is unclear. It may be a result of the calibration problems mentioned earlier but no definitive statement can be made. The fact that the only significant difference occurred in the Ottawa course fractions indicated that good precision is possible with dichotomous-type samplers.

TABLE 21. OTTAWA CONTROL SAMPLER DATA. MASS LOADINGS IN $\mu g/m^3$

FILTER	CONTROL SAMPLER	STUDY SAMPLER	FILTER	CONTROL SAMPLER	STUDY SAMPLER
47C	13.0	15.3	55F	35.0	29.8
47F	13.0	11.2	56C	7.0	10.3
48C	6.0	9.7	56F	14.0	14.7
48F	24.0	23.0	58C	5.0	9.3
49C	15.0	15.9	58F	22.0	20.3
49F	15.0	17.1	59C	10.0	12.6
50C	9.0	18.8	59F	26.0	23.9
50F	20.0	16.5	61C	5.0	10.2
51C	17.0	24.6	61F	28.0	38.3
51F	11.0	10.2	2C	9.0	16.3
52C	21.0	39.9	2F	26.0	28.1
52F	15.0	15.9	3C	12.0	16.3
53C	12.0	11.9	3F	30.0	35.9
53F	5.0	7.6	4C	17.0	19.6
54C	31.0	37.6	4F	29.0	32.9
54F	30.0	26.7	5C	34.0	31.1
55C	14.0	18.4	5F	22.0	22.8

t-tests $t\ .01\ 16 = 2.92$

fine fraction

$\bar{\Delta} = .582 \quad S_\Delta = 3.79 \quad S_{\bar{\Delta}} = .920$

$t_{exp} = .582/1920 = .633$

$\therefore$ not significant

coarse fraction

$\bar{\Delta} = 4.52 \quad S_\Delta = 4.69 \quad S_{\bar{\Delta}} = 1.14$

$t_{exp} = 3.96$

$\therefore$ significant

TABLE 22. TORONTO CONTROL SAMPLER DATA. MASS LOADINGS IN μg

DATE	CONTROL SAMPLERS	
	ANDERSEN	SIERRA
December 26	C 203 F 398	C 200 F 398
January 1	C 176 F 325	C 186 F 318
January 7	C 253 F 240	C 209 F 233
January 13	C 288 F 517	C 309 F 518
January 19	C 350 F1107	C 363 F 959
January 25	C 274 F 718	C 309 F 715

For all samples - coarse flow = 1.67 L/min
total flow = 16.7 L/min
sampling time = 24 hours

t-test

$|\bar{\Delta}| = 11.0 \quad S_{\Delta} = 47.1 \quad S_{\bar{\Delta}} = 13.6$

$t_{.01,11} = 3.11 \quad t_{exp} = 0.81$

$\therefore$ the difference is not significant

TABLE 23: SITE-BY-SITE SUMMARY: AVERAGE TSP AND IP, RATIO OF IP/TSP

$\overline{\text{TSP}}$ and $\overline{\text{IP}}$ in $\mu g/m^3$

	SURVEY TOTALS				FALL				WINTER			
	$\overline{\text{TSP}}$	STD. DEV.	$\overline{\text{IP}}$	$\overline{\text{IP}}/\overline{\text{TSP}}$	$\overline{\text{TSP}}$	STD. DEV.	$\overline{\text{IP}}$	$\overline{\text{IP}}/\overline{\text{TSP}}$	$\overline{\text{TSP}}$	STD. DEV.	$\overline{\text{IP}}$	$\overline{\text{IP}}/\overline{\text{TSP}}$
HALIFAX	38.5	11.4	39.3	1.02	37.0	11.6	32.8	0.89	39.6	12.1	49.2	1.24
MONTREAL	95.5	37.9	57.5	0.60	98.8	33.4	48.5	0.49	90.7	45.3	69.2	0.76
OTTAWA-CURB	57.4	31.8	39.4	0.69	58.6	32.5	39.4	0.67	N/A	N/A	N/A	N/A
OTTAWA-ROOF	55.4	25.6	38.1	0.69	51.3	18.8	34.7	0.68	60.8	32.7	45.6	0.75
TORONTO-CURB	131.8	42.6	47.4	0.36	129.8	42.9	47.4	0.37	N/A	N/A	N/A	N/A
TORONTO-ROOF	61.8	24.6	44.0	0.71	59.8	26.6	36.3	0.61	64.1	23.2	60.2	0.94
WINNIPEG	56.4	37.7	47.6	0.84	67.7	43.7	49.3	0.73	40.9	21.1	45.3	1.11
EDMONTON	102.4	64.1	73.6	0.72	128.2	61.2	85.1	0.66	54.4	37.4	57.0	1.05
VANCOUVER	71.2	39.7	46.7	0.66	82.3	39.9	52.9	0.64	37.7	8.7	31.8	0.84

4.0 COMPARISON OF RESULTS

4.1 I.P. Mass vs. T.S.P. Mass

4.1.1 General

This study was undertaken both to initiate a data base of coast-to-coast Canadian dichotomous sampling data and to develop operational protocols for the field use of dichotomous samplers. In addition, it was clear that a comparison with data from the NAPS network, which uses the well established HiVol sampler, might provide some useful insights.

The most consistent relationships between the two sampler types were observed during the fall sampling period although as discussed previously there is a strong dependence upon city and season. For this reason the fall data are considered more reliable even though the data for both fall and winter have been presented. There are some possible explanations for this. Dichotomous samplers have been known to have operating problems in the winter such as freezing of the sample lines and frosting of the inlet. Another possible explanation of the different winter performance is that some of the flow rates were recalibrated in the field by the operators.

With the exception of the Winnipeg site all of the HiVol samples were collected on Gelman AE glass fibre filters. At Winnipeg Gelman Microquartz filters formed the collection medium.

4.1.2 Comparison of Sampler Data

As in previous sections the months of September, October and November have been designated as the fall sampling period and December and January are the winter months. A summary of the site-by-site TSP means and the rations of IP to TSP are presented in Table 23. The raw sampling data for the HiVol samplers may be found in Appendix VII.

It is readily apparent, from a visual comparison of the TSP data and the dichotomous sampler data, that the HiVol samplers collect a larger portion of airborne particulate matter than the dichotomous samplers. This is expected, since the HiVol collects a much larger-size fraction of airborne particles. Simply comparing the mean mass concentrations at each station is relatively meaningless. A much more valuable comparison is to determine whether there is a fairly well-defined linear relationship between the two sampler types. In addition to the ratios in Table 23 linear regression analysis were run to examine the relationship between TSP and IP. The results of the regression analysis are in Table 24. The regressions were run using the HiVol mass results as the dependent variable and the inhalable particulate mass results as the independent variable. This gives rise to an equation for the regression line of the following form:

$$\mathrm{HIVOL}_{\mathrm{mass}} = m(I\ P_{\mathrm{mass}}) + b$$

where m is the slope and b is the intercept. The uncertainty of the estimates for slope and intercept have been chosen as plus or minus twice the standard error of the estimate. When all of the sampling data are massed for the fall period, the regression yields a slope of 1.46 ± 0.18 and an

TABLE 24: LINEAR REGRESSION ANALYSIS OF TSP VS IP

EQUATION OF FORM: TSP = m(IP)+b m=slope b=intercept

SURVEY TOTAL	SLOPE	STD. ERROR	P:H_o	INTERCEPT ($\mu g/m^3$)	STD. ERROR	P:H_o	R^2
HALIFAX	0,24	0,29	0,443	28,9	13,8	0,069	0,075
MONTREAL	1,03	0,26	0,001	35,5	16,3	0,041	0,442
OTTAWA-CURB	1,54	0,30	0,0001	-1,9	12,7	0,881	0,658
OTTAWA-ROOF	1,17	0,13	0,0001	8,5	5,9	0,169	0,785
TORONTO-CURB	1,45	0,24	0,0001	60,8	12,8	0,0002	0,694
TORONTO-ROOF	0,43	0,31	0,154	44,3	15,4	0,012	0,114
WINNIPEG	1,30	0,37	0,003	-8,9	19,9	0,660	0,417
EDMONTON	1,53	0,18	0,0001	-12,8	15,3	0,413	0,796
VANCOUVER	1,79	0,18	0,0001	-13,8	9,5	0,179	0,916
ALL SITES	1,32	0,09	0,0001	2,5	5,3	0,645	0,628
FALL							
HALIFAX	1,60	0,92	0,224	-16,1	32,0	0,665	0,702
MONTREAL	1,57	0,30	0,0003	23,1	15,5	0,169	0,711
OTTAWA-CURB	1,54	0,30	0,0001	-1,9	12,7	0,881	0,658
OTTAWA-ROOF	1,33	0,14	0,0001	3,3	5,5	0,556	0,886
TORONTO-CURB	1,45	0,24	0,0001	60.8	12,8	0,0002	0,694
TORONTO-ROOF	0,56	0,52	0,276	43,0	20,5	0,077	0,145
WINNIPEG	1,75	0,39	0,002	-20,2	21,0	0,361	0,692
EDMONTON	1,41	0,14	0,0001	8,5	13,0	0,524	0,904
VANCOUVER	1,80	0,20	0,0001	-13,7	11,7	0,285	0,932
ALL SITES	1,46	0,09	0,0001	6,3	5,2	0,228	0,700
WINTER							
HALIFAX	0,21	0,46	0,673	29,3	24,3	0,295	0,049
MONTREAL	1,40	0,37	0,007	-11,1	28,1	0,367	0,676
OTTAWA-CURB	N/A	N/A	N/A	N/A	N/A	N/A	N/A
OTTAWA-ROOF	1,12	0,24	0,002	9,6	12,2	0,453	0,737
TORONTO-CURB	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TORONTO-ROOF	1,19	0,80	0,179	-5,7	48,5	0,910	0,241
WINNIPEG	0,31	0,50	0,549	25,1	26,0	0,373	0,063
EDMONTON	0,96	0,67	0,208	-1,0	40,5	0,982	0,295
VANCOUVER	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ALL SITES	1,11	0,16	0,0001	-1,4	9,3	0,881	0,495

TABLE 25: SITE-BY-SITE SUMMARY: MEAN HIVOL AND I.P. SULPHATE, RATIOS OF I.P. TO HIVOL FOR SULPHATE

$\overline{SO}_4$ in $\mu g/m^3$

	SURVEY TOTALS				FALL				WINTER			
	HIVOL $\overline{SO}_4$	STD. DEV.	I.P. $\overline{SO}_4$	I.P./HIVOL	HIVOL $\overline{SO}_4$	STD. DEV.	I.P. $\overline{SO}_4$	I.P./HIVOL	HIVOL $\overline{SO}_4$	STD. DEV.	I.P. $\overline{SO}_4$	I.P./HIVOL
HALIFAX	14.8	2.6	6.5	0.44	13.5	1.6	5.1	0.38	15.7	2.9	8.7	0.55
MONTREAL	9.1	5.1	5.6	0.62	6.9	2.6	3.6	0.52	12.2	6.2	8.0	0.66
OTTAWA-CURB	N/A	N/A	2.6	N/A	N/A	N/A	2.6	N/A	N/A	N/A	N/A	N/A
OTTAWA-ROOF	10.7	4.0	3.8	0.36	8.8	1.9	2.6	0.30	13.2	4.7	6.9	0.52
TORONTO-CURB	N/A	N/A	3.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TORONTO-ROOF	13.3	3.9	4.5	0.34	12.8	3.5	4.2	0.33	14.5	5.1	5.2	0.36
WINNIPEG	3.4	2.1	3.1	0.91	2.1	1.0	2.3	1.10	4.7	5.2	4.0	0.85
EDMONTON	N/A	N/A	2.8	N/A	N/A	N/A	2.8	N/A	N/A	N/A	2.9	N/A
VANCOUVER	12.8	4.6	4.6	0.36	14.4	4.2	5.1	0.35	8.0	1.5	3.0	0.38

intercept of 6.3 ± 10.4 $\mu g/m^3$. This slope is similar to that observed in other studies of this nature. When regressions are run on the data for individual stations, the range of slopes, excluding the Toronto-roof station, is 1.3 ± 0.3 to 1.8 ± 0.4. This corresponds well to the value observed for the massed data although the smaller data sets have a larger uncertainty. The range of intercept values for the individual stations is quite large, from -20.2 ± 42.0 to 60.8 ± 25.6 $\mu g/m^3$. There are several possible explanations for this large range of values. As illustrated by the uncertainty in the intercept, if there is a large amount of scatter in the data it can have a large effect on the line of best fit and on the certainty of the estimated line. This would tend to explain the negative intercepts observed. Other possible factors that should be mentioned are uncertainty in the actual mass determinations and the possibility of artifact formation on the filters. This last would affect most strongly the glass fibre filters used in most of the HiVol samplers.

The anomalous results for the fall regression line at the Toronto-roof station may be explained by fact that the data set contains some points which would probably have been discarded as outliers had suitable criteria been available. This reason and the fact that there is a large seasonal difference at this station resulting in very different data sets for the fall and winter explains why the slope of the regression line for the overall survey at Toronto-roof is lower than that for either fall or winter.

There is a large variation in the regression slopes for the winter data. For the fall period all of the I P to TSP ratios are less than one. In the winter the ratios for Halifax, Winnipeg and Edmonton exceed 1.0. These data from these three stations also exhibit the poorest fit to the calculated regression lines. This problem could be due to the recalibrations mentioned previously. When these three stations are disregarded the winter regression lines show better agreement with those for the fall data.

4.2 Ionic and Elemental Concentrations

4.2.1 General

The HiVol filters were analyzed for the same elements and ions as were the dichotomous filters. The results of these analyses are in Appendix 3. Unfortunately much of the data are missing but the data set is as complete as could be obtained. Winnipeg is the only station for which arsenic and chromium concentrations were obtained. The other stations have fairly complete information for mass, lead, and sulphate with the exception of Edmonton and the two curbside locations which were missing some parameters.

4.2.2 Comparison of Sampler Data

The mean lead and sulphate concentrations along with the ratios of I.P. to HiVol are presented in Tables 25 and 26 respectively. From these tables it appears that lead and sulphate may not obey the same relationship between sampler types as was observed for mass. To verify this, linear regression analyses were run and the results may be found in Tables 27 and 28.

When regression analyses for lead are compared to those for mass, the overall results are similar. The R^2 coefficients are similar for mass and for lead. The slope for the massed data for lead is 1.22 ± 0.14 as compared to 1.32 ± .18 for mass. As observed previously there are seasonal and city-to-city variations. Since lead exists predominantly in the fine fraction

TABLE 26: SITE-BY-SITE SUMMARY: MEAN HIVOL AND I.P. LEAD, RATIOS OF I.P. TO HIVOL FOR LEAD

$\overline{Pb}$ in ng/m^3

	SURVEY TOTALS				FALL				WINTER			
	HIVOL $\overline{Pb}$	STD. DEV.	I.P. $\overline{Pb}$	I.P./HIVOL	HIVOL $\overline{Pb}$	STD. DEV.	I.P. $\overline{Pb}$	I.P./HIVOL	HIVOL $\overline{Pb}$	STD. DEV.	I.P. $\overline{Pb}$	I.P./HIVOL
HALIFAX	268	222	241	0.90	138	73	213	1.54	316	250	282	0.89
MONTREAL	1050	332	865	0.82	1050	303	850	0.81	1060	390	888	0.84
OTTAWA-CURB	762	499	686	0.90	766	515	686	0.90	N/A	N/A	N/A	N/A
OTTAWA-ROOF	505	349	538	1.07	480	356	530	1.10	537	170	557	1.04
TORONTO-CURB	758	222	683	0.90	761	228	683	0.90	N/A	N/A	N/A	N/A
TORONTO-ROOF	377	205	377	1.00	350	258	379	1.08	410	120	373	0.91
WINNIPEG	454	240	478	1.05	465	249	432	0.93	453	244	540	1.19
EDMONTON	N/A	N/A	745	N/A	N/A	N/A	742	N/A	N/A	N/A	750	N/A
VANCOUVER	1080	713	877	0.81	1290	859	1017	0.79	439	242	494	1.13

TABLE 29: MEAN CHROMIUM AND ARSENIC CONCENTRATIONS (ng/m^3) FOR WINNIPEG HIVOL SAMPLER AND REGRESSION VS. IP

	SURVEY TOTALS		FALL		WINTER	
	MEAN	STD. DEV.	MEAN	STD. DEV.	MEAN	STD. DEV.
CHROMIUM	8.6	2.3	13.8	7.4	10.8	5.6
ARSENIC	1.5	1.1	1.8	1.3	1.6	1.2

REGRESSION ANALYSIS - EQUATION OF FORM HIVOL = m(IP)+b, m = slope b = intercept

SURVEY TOTAL	SLOPE	STD. ERROR	P:H_0	INTERCEPT (ng/m^3)	STD. ERROR	P:H_0	R^2
CHROMIUM	-0.151	0.129	0.265	13.7	2.57	0.0001	0.094
ARSENIC	-0.003	0.008	0.697	1.52	0.36	0.001	0.014

FALL							
CHROMIUM	-0.013	0.064	0.847	9.01	1.60	0.001	0.007
ARSENIC	-0.004	0.009	0.665	1.66	4.91	0.012	0.028

WINTER							
CHROMIUM	-0.466	0.653	0.508	18.8	7.1	0.045	0.092
ARSENIC	-6.67	7.70	0.478	-45.0	53.4	0.488	0.273

TABLE 27: LINEAR REGRESSION ANALYSIS OF HIVOL LEAD VS. IP LEAD

EQUATION OF FORM: HIVOL $Pb = m(IP_{Pb})+b$ m=slope b=intercept

SURVEY TOTAL	SLOPE	STD. ERROR	$P:H_0$	INTERCEPT (ng/m^3)	STD. ERROR	$P:H_0$	R^2
HALIFAX	0.42	1.19	0.742	217	345	0.564	0.030
MONTREAL	0.31	0.17	0.0001	205	159	0.217	0.647
OTTAWA-CURB	1.18	0.04	0.0001	-76	31	0.031	0.936
OTTAWA-ROOF	1.07	0.06	0.0001	-96	30	0.005	0.951
TORONTO-CURB	0.88	0.12	0.0001	160	86	0.082	0.770
TORONTO-ROOF	0.95	0.16	0.0001	13	67	0.853	0.705
WINNIPEG	0.83	0.13	0.0001	71	74	0.230	0.812
EDMONTON	N/A	N/A	N/A	N/A	N/A	N/A	N/A
VANCOUVER	1.48	0.23	0.0001	-126	215	0.574	0.825
ALL SITES	1.22	0.07	0.0001	-88	44	0.051	0.795
FALL							
HALIFAX	0.17	N/A	N/A	70.9	N/A	N/A	1.000
MONTREAL	0.93	0.15	0.0001	206	134	0.159	0.827
OTTAWA-CURB	1.18	0.04	0.0001	-76	32	0.031	0.986
OTTAWA-ROOF	1.11	0.08	0.0001	-107	40	0.323	0.949
TORONTO-CURB	0.88	0.12	0.0001	160	86	0.082	0.770
TORONTO-ROOF	0.94	0.21	0.003	7	96	0.344	0.738
WINNIPEG	0.89	0.11	0.0001	107	56	0.394	0.886
EDMONTON	N/A	N/A	N/A	N/A	N/A	N/A	N/A
VANCOUVER	1.41	0.34	0.006	-27	363	0.943	0.742
ALL SITES	1.34	0.08	0.001	-108	53	0.046	0.861
WINTER							
HALIFAX	-.75	1.76	0.710	679	583	0.364	0.084
MONTREAL	.91	0.44	0.107	79	423	0.861	0.518
OTTAWA-CURB	N/A	N/A	N/A	N/A	N/A	N/A	N/A
OTTAWA-ROOF	1.02	0.06	0.0001	-86	33	0.065	0.975
TORONTO-CURB	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TORONTO-ROOF	1.01	0.36	0.031	-2	142	0.392	0.565
WINNIPEG	0.89	0.22	0.011	-41	139	0.839	0.933
EDMONTON	N/A	N/A	N/A	N/A	N/A	N/A	N/A
VANCOUVER	1.06	0.25	0.146	-20	119	0.892	0.949
ALL SITES	0.86	0.11	0.001	44	66	0.512	0.646

TABLE 28: LINEAR REGRESSION ANALYSIS OF HIVOL SULPHATE VS. IP SULPHATE

EQUATION OF FORM: $HIVOL_{SO_4} = m\,(IP_{SO_4})+b$ m=slope b=intercept

SURVEY TOTAL	SLOPE	STD. ERROR	P:Ho	INTERCEPT (μg/m³)	STD. ERROR	P:Ho	R^2
HALIFAX	0.635	0.206	0.037	9.3	1.5	0.004	0.704
MONTREAL	0.778	0.269	0.011	9.2	1.7	0.031	0.359
OTTAWA-CURB	N/A	N/A	N/A	N/A	N/A	N/A	N/A
OTTAWA-ROOF	0.606	0.128	0.0002	7.2	.07	0.0001	0.553
TORONTO-CURB	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TORONTO-ROOF	0.707	0.159	0.002	10.0	1.0	0.0001	0.713
WINNIPEG	0.543	0.266	0.069	2.1	1.1	0.078	0.294
EDMONTON	N/A	N/A	N/A	N/A	N/A	N/A	N/A
VANCOUVER	0.828	0.493	0.127	8.9	2.7	0.010	0.239
ALL SITES	.804	0.138	0.0001	5.9	0.8	0.0001	0.314
FALL							
HALIFAX	1.000	N/A	N/A	8.7	N/A	N/A	1.000
MONTREAL	0.773	0.355	0.061	3.3	1.4	0.051	0.372
OTTAWA-CURB	N/A	N/A	N/A	N/A	N/A	N/A	N/A
OTTAWA-ROOF	0.190	0.315	0.860	8.2	1.0	0.0001	0.035
TORONTO-CURB	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TORONTO-ROOF	0.640	0.126	0.023	10.8	0.9	0.0001	0.811
WINNIPEG	0.546	0.069	0.016	1.3	0.2	0.022	0.969
EDMONTON	N/A	N/A	N/A	N/A	N/A	N/A	N/A
VANCOUVER	0.443	0.549	0.451	12.2	3.4	0.011	0.098
ALL SITES	0.915	0.213	0.0001	6.3	1.0	0.0001	0.306
WINTER							
HALIFAX	1.091	0.260	0.052	4.9	2.3	0.161	0.898
MONTREAL	0.332	0.576	0.589	9.1	5.1	0.136	0.062
OTTAWA-CURB	N/A	N/A	N/A	N/A	N/A	N/A	N/A
OTTAWA-ROOF	0.839	0.139	0.001	5.6	1.1	0.002	0.858
TORONTO-CURB	0.416	0.365	0.298	3.0	1.6	0.118	0.178
TORONTO-ROOF	2.103	N/A	N/A	2.4	N/A	N/A	1.000
WINNIPEG	0.416	0.365	0.298	3.0	1.6	0.118	0.178
EDMONTON	N/A	N/A	N/A	N/A	N/A	N/A	N/A
VANCOUVER	1.56	0.121	0.049	3.3	0.4	0.072	0.994
ALL SITES	0.898	0.188	0.0001	4.3	1.3	0.002	0.431

and both samplers have similar efficiences for fine particulates, the regression slope for lead was expected to be close to 1.0. The analyses of the sampling data support this, particularly when the individual cities are examined. When Halifax and Vancouver are disregarded the individual slopes range from 0.89 ± 0.44 to 1.18 ± .08. Halifax is anomalous because there are only a few valid data points and they have high scatter.

The ratios of I P to HiVol for lead are also similar to those for mass with higher ratios being observed in the winter than those for the fall data. Overall the ratios for lead for the fall period are closer to 1.0 than those for mass.

The sulphate data resulted in regression lines quite different from those for lead and mass and with poorer fit for the overall data. This is evidence for the expected result, that there is not a linear relationship between the sulphate collected on glass fibre filters in the HiVol samplers and that collected on Teflon filters in the dichotomous samplers. Since sulphate is primarily found in the fine fraction it would ordinarily be expected to show a relationship much the same as was observed for lead. However, calculations based on some laboratory and field studies indicate that the glass fibre filter used for most HiVol sampling may promote the formation of from 1 to 3 $\mu g/m^3$ of artifact sulphate in Canadian sampling conditions. This effect may be indicated by the ratios of I P to HiVol sulphate. All of these ratios are quite low except for the Winnipeg station which used quartz filters. Since quartz does not promote artifact formation these ratios are close to the expected result of 1.0. The slope of the overall regression line for sulphate at Winnipeg is 0.543 ± .52.

The mean concentrations and regression analyses for arsenic and chromium for the Winnipeg site are presented in Table 29. There appears to be no linear relation between the concentrations observed by the two sampling types. The reason for this is not readily apparent especially since higher concentration of these two species is found on the dichotomous filters than on the HiVol filters. Possible explanations may be the uncertainty involved in measuring the small quantities present or the fact that different analytical techniques were used. As explained in Appendix II it is believed that digestion problems in the analytical technique lead to values from the dichotomous filters that are one half to one third of the true values.

5.0 DISCUSSION

5.1 General

There have been studies in the past to compare different sampler types, many of these being run in the United States. One difficulty in comparing the data from other studies is that size fractions collected by respirable particulate samplers are not always the same. The middle cut-point varies from 2.5 to 3.5 μm and the coarse cut ranges from 10 to 30 μm aerodynamic diameter, thus not all studies will produce useful comparison data. There are other factors that will affect such a comparison. These include the use of different filter media, the extent of artifact formation, the meteorological conditions, the sampling schedules(s), the geographical location of the instrument and the location of the instrument relative to emission sources in the area.

5.2 U.S. Multi-City Studies

A four city study completed in 1979 provides some interesting comparative data[8]. The four cities were Topeka, Kansas, Watertown, Maryland, Stuebenville, Ohio and Kingston, Tennessee. There were three sampler types involved, two of which are of interest. These were HiVol samplers using glass fibre filters and dichotomous samplers using Teflon filters which were analyzed for mass loading by beta absorption. Since these conditions are much the same as those employed during the seven city Canadian study the two studies could exhibit similar relationships between samplers and size fractions, even though the data are highly dependent on the sampler location.

At three of the four sites the fine mass comprised 65 per cent of the inhalable particulate fraction and at the remaining site 45 per cent. The mean TSP concentrations ranged from 46 to 107 μg/m^3 and from 27 to 58 μg/m^3 for the IP concentration. The ratio of TSP to IP ranged from 1.4 to 2.0. These values all tend to agree with the ranges of values observed throughout the seven city study, especially when the best case fall values from the Canadian dichotomous samplers are used.

5.3 Sampler Intercomparison

The United States Environmental Protection Agency sponsored an intensive sampler intercomparison[2] for an eight day period in May 1977, during which time a maximum of sixteen samples were collected by each of the twenty-nine samplers involved. The sampling site was the roof of the Federal Building in Charleston, West Virginia. Because of the short duration of the study the sampling conditions would have been more homogeneous than they were for the Canadian survey. The mass concentrations were higher in Charleston than those observed in Canada but the basic ratios for the size fractions should be similar. Of the twenty-nine samplers, two HiVol samplers and two dichotomous samplers were operated in a similar fashion to those used in the seven city program. The average TSP concentration was 126 μg/m^3 and the average IP concentration was 82 μg/m^3. The mean fine fraction concentration was 47 μg/m^3 or 57% of the mass and the coarse fraction concentration was 35 μg/m^3. The ratio of TSP to IP was 1.54. Both the distribution between the fine and coarse fractions and the ratio of TSP to IP agree well with the Canadian data. The agreement between surveys was not as good for lead and sulphate. An average of 82 per cent of the lead was observed in the fine fraction of the IP samples. This is at the high end of the range of values observed in Canada. Even with 82 per cent in the fine fraction the agreement between sampler types is not ideal with the mean ratio of HiVol lead to I P lead being 1.4. This is larger than was observed in the Canadian study. The dichotomous sampling data showed an average of 96 per cent of the sulphate in the fine fraction. The average ratio of HiVol to I P sulphate was 1.3. Since the sulphate is primarily present in the fine particles, the surplus present on the HiVol filters is almost certainly artifact sulphate. There is less difference between HiVol sulphate and I P sulphate than was present in the Canadian samples.

5.4 Artifact Formation

The magnitude of the difference in sulphate concentrations between the two sampler types during the Canadian survey, was greater than the expected value, which was 1 to 3 $\mu g/m^3$. There are many variables that have an effect on the formation of artifact sulphate, nevertheless this estimate is believed to be valid for a range of sampling conditions that should occur frequently in Canada. An average difference exceeding 6 $\mu g/m^3$ was observed at some sampling sites, double the expected quantity. In the Charleston study the average difference was 4 $\mu g/m^3$ which is also a bit higher than expected. One possible explanation might be the different analytical methods used on the dichotomous sampler filters during the two studies. The exposed Teflon filters in the Canadian study were extracted into an aqueous solution to measure sulphate; whereas, both XRF and extractive techniques were used in the Charleston study. Since Teflon is hydrophobic any particles physically entrained within the filter may not be fully extracted. This would result in an artifically low value being calculated for IP sulphate. Generally, however, the correspondence between sulphate in aqueons extracts and as determined by XRF as total sulphur is good (both referring to Teflon filters).

The Winnipeg results, however, suggest that the analytical method may not be the determing factor, since HiVol and IP filters analyzed by the aqueous extraction method produced similar sulphate values. Quartz fibre filters, believed to minimize artifact formation, were utilized at the Winnipeg NAPS site.

One factor that will affect the data and the relationship between the two sampler types is the fact that both exhibit some sensitivity to wind speed. HiVol samplers are more sensitive to wind speed than are the dichotomous samplers. The peaked cover of the HiVol unit also results in a sampling efficiency that is somewhat dependent on the wind direction. In effect the sampler behaves differently when it is oriented with a vertical side of the cover in the direction of the wind than it does when the wind strikes a sloped side of the inlet. This is not necessarily a large effect.

In an American study some concern has been raised about the potential sensitivity, of the standard dichotomous sampler inlet, to wind speed[9]. This effect is believed to be more pronounced when the ambient particulate concentration is high. In wind-tunnel tests, winds of less than 5 km/hr or greater than 25 km/hr had the greatest effect on the size fraction collected. A field comparison of the standard inlet with an experimental inlet, designed by the University of Minnesota to minimize wind speed effects, gave a mean difference of less than 5 per cent when the mass determination uncertainty was ignored. This figure doubles when the uncertainties in the mass determinations are included. The standard inlet collected slightly more mass in the coarse fraction than did the experimental model. There was insufficient data to extrapolate from these results and during most of the study the winds averaged between 5 and 20 km/hr, a range which causes the least effect.

There is some concern over the high levels observed for the mass blanks throughout the Canadian survey. This is an area that will need to be explored in subsequent studies. It is not possible to offer an explanation from the results of this study because the handling of the blank filters by the field operators did not follow a standard protocol.

6.0 RECOMMENDATIONS

The study drew attention to several areas where more information is needed and as such suggest possibilities for further studies. Many of these areas relate to filter handling and analysis.

Filter transportation was an area that proved to be of some concern. The tip-proof shipping box used during the study proved to be unsuccessful in preventing rough handling by the public carriers used. It may prove possible simply to ship the filters, in the petri dishes, in a padded envelope. A controlled study into the feasibility of this should be implemented or incorporated into an existing or upcoming survey.

Another area of importance is an examination of the effects of conditioning and static discharging on the mass determinations. The magnitude of the effect seems to be different on exposed filters and blank filters. The type of conditioning cabinets used in this study as well as the two types of static discharges should be included. Related to this would be an examination of the efficiency of extracting hydrophabia filters in aqueous media.

It became apparent during the course of the study that the accuracy and precision of the dichotomous sampler data are heavily dependent upon the care exercised by the participants. Because the quantities of sampled particulate matter are small and because the instruments are complex when compared to the relatively simple HiVol sampler, improper handling and operation can introduce a large uncertainty into the observed results. To this end more rigorous quality assurance and quality control procedures should be devised, tested and put into operation. The samplers also appeared to be less reliable in the cold weather. These observations imply that an intensive study using replicate samplers at a few sites should be initiated to learn more about the operating characteristics of dichotomous samplers.

Over the course of the study some concerns were raised over the accuracy and reproducibility of the elemental analyses. In view of the very small quantities of mass involved the precision was generally good but there is definitely room for improvement, particularly for lead analysis. It is also believed that the per cent recovery of some of the methods employed, especially those for arsenic and chromium, is not very good. The development and verification of analytical techniques that will give both good recovery and good precision with the small quantities of mass involved should be a priority.

At the present time there are too many unknowns concerning the reliable operation of dichotomous samplers to recommend the creation of a sampling network at this time. However the growing necessity for size fractionated particulate data, especially in the inhalable particulate size range, makes it imperative that further evaluations of dichotomous and other size fractionating samplers be undertaken.

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APPENDIX I

RAW DATA

DICHOTOMOUS AIRBORNE PARTICULATE STUDY

SAMPLE ID	DURATION (MIN.)	FRACTION	FILTER NO.	FLOW (L/M)	MASS (UG/M3)	NITRATE (UG/M3)	SULFATE (UG/M3)	ARSENIC (NG/M3)	CADMIUM (NG/M3)	CHROMIUM (NG/M3)	LEAD (NG/M3)	COMMENTS
HALIFAX 24SEPT80 NAPS NO. 45.0	1438	COARSE	200	1.0	25.0	0.0	0.0	0.0	0.0	0.0	0.0	
		FINE	201	10.0	12.9	0.0	0.0	0.0	0.0	0.0	0.0	A
TOTAL (<15 MICROMETRES)				11.0	37.9							
HALIFAX 30SEPT80 NAPS NO. 46.0	1443	COARSE	202	1.7	18.6	0.4	0.8	7.8	< 29.3	5.2	93.5	
		FINE	203	15.1	14.9	0.1	3.9	4.6	< 36.7	5.5	137.5	
TOTAL (<15 MICROMETRES)				16.8	33.5	0.5	4.8	12.4	< 66.0	10.7	231.0	
HALIFAX 6OCT80 NAPS NO. 47.0	1440	COARSE	206	1.7	12.4	0.1	0.3	7.8	< 29.4	5.0	< 42.2	
		FINE	309	15.1	13.9	0.0	2.6	4.6	< 36.7	0.0	91.8	FA
TOTAL (<15 MICROMETRES)				16.8	26.3		2.9	12.4	< 66.1		> 91.8	
HALIFAX 12OCT80 NAPS NO. 48.0	1442	COARSE	310	1.7	15.1	0.4	0.7	< 7.4	< 29.5	0.4	31.4	
		FINE	311	15.0	17.1	0.0	4.3	< 9.2	< 36.9	< 3.7	101.5	FA
TOTAL (<15 MICROMETRES)				16.7	32.2		5.0	< 16.6	< 66.4	> 0.4	132.9	
HALIFAX 18OCT80 NAPS NO. 49.0	1443	COARSE	312	1.7	18.8	1.1	1.8	< 8.3	< 33.4	8.3	50.1	
		FINE	313	14.9	20.9	0.0	0.0	0.0	0.0	0.0	0.0	FA
TOTAL (<15 MICROMETRES)				16.6	39.7							
HALIFAX 24OCT80 NAPS NO. 50.0	1442	COARSE	317	1.7	19.3	0.2	1.3	7.3	< 29.4	13.2	63.5	
		FINE	318	15.1	17.4	0.0	< 0.1	9.2	< 36.7	0.0	275.0	FA
TOTAL (<15 MICROMETRES)				16.8	36.7		> 1.3	16.5	< 66.0		338.5	

COMMENT CODES
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A - MISSING
C - COARSE
D - VOID
F - FINE

Concord Scientific Corporation

DICHOTOMOUS AIRBORNE PARTICULATE STUDY

SAMPLE ID	DURATION (MIN.)	FRACTION	FILTER NO.	FLOW (L/M)	MASS (UG/M3)	NITRATE (UG/M3)	SULFATE (UG/M3)	ARSENIC (NG/M3)	CADMIUM (NG/M3)	CHROMIUM (NG/M3)	LEAD (NG/M3)	COMMENTS
HALIFAX 30OCT80 NAPS NO. 51.0	1442	COARSE	319	1.7	16.7	0.1	0.7	7.3	< 29.4	0.0	58.0	
		FINE	320	15.1	28.0	0.0	9.5	9.2	< 36.7	0.0	247.5	A
		TOTAL (<15 MICROMETRES)		16.8	44.7		10.2	16.5	< 66.0		305.5	
HALIFAX 5NOV80 NAPS NO. 52.0	1443	COARSE	321	1.7	10.1	0.1	0.2	3.7	< 29.5	< 1.5	44.3	
		FINE	322	15.0	16.0	0.4	5.1	4.6	< 36.9	14.8	138.3	
		TOTAL (<15 MICROMETRES)		16.7	26.1	0.5	5.2	8.3	< 66.4	> 14.8	182.6	
HALIFAX 11NOV80 NAPS NO. 53.0	1443	COARSE	323	1.7	6.2	0.0	< 0.6	3.7	< 29.7	5.2	52.8	
		FINE	414	14.9	12.0	0.0	3.5	4.6	< 37.1	< 1.9	139.3	
		TOTAL (<15 MICROMETRES)		16.6	18.2		> 3.5	8.3	< 66.8	> 5.2	192.0	
HALIFAX 17NOV80 NAPS NO. 54.0	1440	COARSE	415	1.7	19.0	0.8	1.6	< 4.2	< 33.3	< 1.7	133.1	
		FINE	416	15.0	19.6	0.0	0.0	0.0	0.0	0.0	0.0	FA
		TOTAL (<15 MICROMETRES)		16.7	38.6							
HALIFAX 23NOV80 NAPS NO. 55.0	1440	COARSE	417	1.7	11.0	0.4	0.0	< 3.7	< 29.5	0.6	111.5	
		FINE	418	15.1	17.1	0.2	5.0	< 4.6	< 36.8	11.1	128.9	CA
		TOTAL (<15 MICROMETRES)		16.8	28.1	0.5		< 8.3	< 66.3	11.6	240.5	
HALIFAX 29NOV80 NAPS NO. 56.0	1440	COARSE	423	1.7	19.8	< 0.2	1.7	< 3.7	< 29.5	< 1.8	44.3	
		FINE	424	15.1	11.2	4.9	5.5	< 4.6	< 36.8	1.8	138.2	
		TOTAL (<15 MICROMETRES)		16.8	31.0	> 4.9	7.2	< 8.3	< 66.3	> 1.8	182.4	

COMMENT CODES
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A - MISSING	D - VOID
C - COARSE	F - FINE

DICHOTOMOUS AIRBORNE PARTICULATE STUDY

SAMPLE ID	DURATION (MIN.)	FRACTION	FILTER NO.	FLOW (L/M)	MASS (UG/M3)	NITRATE (UG/M3)	SULFATE (UG/M3)	ARSENIC (NG/M3)	CADMIUM (NG/M3)	CHROMIUM (NG/M3)	LEAD (NG/M3)	COMMENTS
HALIFAX 5DEC80 NAPS NO. 57.0	1442	COARSE	425	1.7	13.6	0.0	< 0.7	< 3.7	< 29.5	8.9	124.6	
		FINE	546	15.0	14.8	0.0	4.8	< 4.6	< 36.9	11.1	83.1	
		TOTAL (<15 MICROMETRES)		16.7	28.3		> 4.8	< 8.3	< 66.4	19.9	207.6	
HALIFAX 11DEC80 NAPS NO. 58.0	1441	COARSE	421	1.7	15.2	0.0	0.2	< 4.2	< 33.2	4.2	66.5	
		FINE	422	15.0	18.9	0.0	9.3	0.0	0.0	0.0	0.0	FA
		TOTAL (<15 MICROMETRES)		16.7	34.1		9.6					
HALIFAX 23DEC80 NAPS NO. 60.0	1354	COARSE	547	1.7	15.0	0.0	2.2	< 4.4	< 35.4	8.0	35.4	
		FINE	548	15.0	27.0	0.0	0.0	0.0	0.0	0.0	0.0	FA
		TOTAL (<15 MICROMETRES)		16.7	42.0							
HALIFAX JAN4/81 NAPS NO. 1.0	1439	COARSE	551	1.7	21.7	0.0	0.1	< 3.7	< 29.2	7.8	74.8	
		FINE	552	15.2	38.6	0.0	9.4	< 4.6	< 36.6	4.6	155.4	
		TOTAL (<15 MICROMETRES)		16.9	60.3		9.5	< 8.2	< 65.8	12.3	230.3	
HALIFAX JAN10/81 NAPS NO. 2.0	1440	COARSE	553	1.7	17.6	0.0	0.1	< 3.7	< 29.6	< 1.5	67.5	
		FINE	554	15.0	33.5	0.0	5.9	< 4.6	< 37.0	< 1.8	157.1	
		TOTAL (<15 MICROMETRES)		16.7	51.1		5.9	< 8.3	< 66.5	< 3.3	224.6	
HALIFAX JAN16/81 NAPS NO. 3.0	1439	COARSE	555	1.7	21.1	0.0	0.4	< 3.7	< 12.9	4.3	96.2	
		FINE	556	15.0	35.8	0.0	7.0	< 4.6	< 37.0	< 1.8	369.9	
		TOTAL (<15 MICROMETRES)		16.7	57.0		7.4	< 8.3	< 49.9	> 4.3	466.1	

COMMENT CODES
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A - MISSING
C - COARSE
D - VOID
F - FINE

DICHOTOMOUS AIRBORNE PARTICULATE STUDY

SAMPLE ID	DURATION (MIN.)	FRACTION	FILTER NO.	FLOW (L/M)	MASS (UG/M3)	NITRATE (UG/M3)	SULFATE (UG/M3)	ARSENIC (NG/M3)	CADMIUM (NG/M3)	CHROMIUM (NG/M3)	LEAD (NG/M3)	COMMENTS
HALIFAX												
JAN22/81												
NAPS NO. 4.0	1324	COARSE	557	1.7	19.9	0.0	0.0	< 4.0	< 32.2	< 2.8	37.2	
		FINE	684	15.0	26.6	0.0	4.7	< 5.0	< 40.2	10.1	170.9	
TOTAL (<15 MICROMETRES)				16.7	46.5			< 9.0	< 72.4	> 10.1	208.0	CA
HALIFAX												
JAN28/81												
NAPS NO. 5.0	1442	COARSE	687	1.7	37.0	0.0	0.6	< 3.7	< 29.5	7.8	80.3	
		FINE	688	15.0	37.0	0.0	10.5	< 4.6	< 36.9	5.5	276.8	
TOTAL (<15 MICROMETRES)				16.7	74.0		11.1	< 8.3	< 66.4	13.3	357.1	

COMMENT CODES
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A - MISSING
C - COARSE

D - VOID
F - FINE

DICHOTOMOUS AIRBORNE
PARTICULATE STUDY

SAMPLE ID	DURATION (MIN.)	FRACTION	FILTER NO.	FLOW (L/M)	MASS (UG/M3)	NITRATE (UG/M3)	SULFATE (UG/M3)	ARSENIC (NG/M3)	CADMIUM (NG/M3)	CHROMIUM (NG/M3)	LEAD (NG/M3)	COMMENTS
MONTREAL 18SEPT80 NAPS NO. 44.0	1416	COARSE	207	1.7	28.1	0.2	0.4	3.8	< 30.3	5.4	171.0	
		FINE	208	14.9	17.4	0.1	2.1	4.7	< 38.0	5.7	673.9	
		TOTAL (<15 MICROMETRES)		16.6	45.5	0.3	2.6	8.5	< 68.3	11.1	844.9	
MONTREAL 24SEPT80 NAPS NO. 45.0	1454	COARSE	209	1.7	23.1	0.4	0.7	7.3	< 29.3	4.5	54.0	
		FINE	210	15.0	22.0	0.1	3.7	9.2	< 36.6	4.6	530.8	
		TOTAL (<15 MICROMETRES)		16.7	45.1	0.5	4.4	16.5	< 65.9	9.1	584.8	
MONTREAL 30SEPT80 NAPS NO. 46.0	1453	COARSE	211	1.7	44.0	1.3	2.0	7.3	< 29.3	7.3	254.6	
		FINE	212	15.0	27.4	0.0	0.0	9.2	< 36.6	9.2	833.4	FA
		TOTAL (<15 MICROMETRES)		16.7	71.4			16.5	< 65.9	16.5	1088.0	
MONTREAL 6OCT80 NAPS NO. 47.0	1448	COARSE	294	1.7	46.5	0.3	0.4	3.7	< 29.4	31.2	204.9	
		FINE	295	15.0	25.0	0.1	0.5	4.6	< 36.8	18.4	1010.9	
		TOTAL (<15 MICROMETRES)		16.7	71.5	0.4	1.0	8.3	< 66.2	49.6	1215.8	
MONTREAL 12OCT80 NAPS NO. 48.0	1446	COARSE	296	1.7	14.1	0.1	0.3	3.7	< 29.4	16.6	126.1	
		FINE	297	15.0	11.9	0.1	2.0	4.6	< 36.8	0.0	395.7	FA
		TOTAL (<15 MICROMETRES)		16.7	26.0	0.2	2.3	8.3	< 66.3		521.8	
MONTREAL 18OCT80 NAPS NO. 49.0	1441	COARSE	298	1.7	29.4	0.4	0.2	4.6	< 29.6	12.9	207.8	
		FINE	299	15.0	28.1	0.1	6.5	< 4.6	< 36.9	36.9	831.1	
		TOTAL (<15 MICROMETRES)		16.7	57.5	0.5	6.7	> 4.6	< 66.5	49.9	1038.9	

COMMENT CODES
****

A - MISSING
C - COARSE

D - VOID
F - FINE

DICHOTOMOUS AIRBORNE
PARTICULATE STUDY

SAMPLE ID	DURATION (MIN.)	FRACTION	FILTER NO.	FLOW (L/M)	MASS (UG/M3)	NITRATE (UG/M3)	SULFATE (UG/M3)	ARSENIC (NG/M3)	CADMIUM (NG/M3)	CHROMIUM (NG/M3)	LEAD (NG/M3)	COMMENTS
MONTREAL 24OCT80 NAPS NO. 50.0	1453	COARSE	300	1.7	37.0	0.4	0.3	< 4.6	< 29.3	29.3	262.8	
		FINE	301	15.0	23.3	0.2	3.5	4.6	< 36.6	36.6	751.0	
TOTAL (<15 MICROMETRES)				16.7	60.3	0.6	3.8	> 4.6	< 65.9	65.9	1013.8	
MONTREAL 30OCT80 NAPS NO. 51.0	1452	COARSE	302	1.7	16.6	0.0	< 0.4	< 3.7	< 29.3	29.3	154.9	
		FINE	303	15.0	24.4	0.2	3.4	< 4.6	< 36.7	36.7	1008.1	
TOTAL (<15 MICROMETRES)				16.7	41.0		> 3.4	< 8.2	< 66.0	66.0	1163.0	
MONTREAL 5NOV80 NAPS NO. 52.0	1451	COARSE	426	1.7	15.2	0.1	< 0.6	< 3.7	< 29.2	4.3	151.8	
		FINE	427	15.1	11.6	0.1	2.6	< 4.6	< 36.5	< 1.8	538.6	
TOTAL (<15 MICROMETRES)				16.8	26.8	0.2	> 2.6	< 8.2	< 65.8	> 4.3	690.4	
MONTREAL 11NOV80 NAPS NO. 53.0	1456	COARSE	428	1.7	9.5	0.1	< 0.5	< 3.6	< 29.0	9.8	83.6	
		FINE	429	15.2	11.2	0.0	2.5	< 4.5	< 36.2	8.1	226.2	
TOTAL (<15 MICROMETRES)				16.9	20.7		> 2.5	< 8.2	< 65.2	17.9	309.8	
MONTREAL 17NOV80 NAPS NO. 54.0	1451	COARSE	430	1.7	48.2	1.2	< 0.3	< 4.1	< 32.9	3.3	435.6	
		FINE	431	15.1	26.9	0.0	0.0	0.0	0.0	0.0	0.0	FA
TOTAL (<15 MICROMETRES)				16.8	75.1							
MONTREAL 23NOV80 NAPS NO. 55.0	1448	COARSE	432	1.7	47.2	0.3	0.6	< 3.7	< 29.3	8.3	450.5	
		FINE	433	15.1	2.2	0.5	5.7	< 4.6	< 36.6	7.3	439.1	
TOTAL (<15 MICROMETRES)				16.8	49.4	0.8	6.3	< 8.2	< 65.9	15.6	889.5	

COMMENT CODES
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A - MISSING	D - VOID
C - COARSE	F - FINE

DICHOTOMOUS AIRBORNE
PARTICULATE STUDY

SAMPLE ID	DURATION (MIN.)	FRACTION	FILTER NO.	FLOW (L/M)	MASS (UG/M3)	NITRATE (UG/M3)	SULFATE (UG/M3)	ARSENIC (NG/M3)	CADMIUM (NG/M3)	CHROMIUM (NG/M3)	LEAD (NG/M3)	COMMENTS
MONTREAL 29NOV80 NAPS NO. 56.0	1453	COARSE	434	1.7	43.3	0.0	< 0.3	4.1	< 32.7	< 1.6	< 32.7	
		FINE	435	15.2	-3.8	0.0	0.0	0.0	0.0	0.0	0.0	D
TOTAL (<15 MICROMETRES)				16.9	39.5							
MONTREAL 5-DEC-80 NAPS NO. 57.0	800	COARSE	558	1.0	22.6	0.0	0.0	0.0	0.0	0.0	0.0	
		FINE	559	10.0	27.6	0.0	0.0	0.0	0.0	0.0	0.0	A
TOTAL (<15 MICROMETRES)				11.0	50.2							
MONTREAL 11-DEC-80 NAPS NO. 58.0	1443	COARSE	560	1.7	13.5	< 4.4	1.3	< 3.7	< 29.4	11.8	45.3	
		FINE	561	15.1	27.1	44.5	6.6	< 4.6	< 36.8	14.7	625.0	
TOTAL (<15 MICROMETRES)				16.8	40.6	> 44.5	7.9	< 8.3	< 66.2	26.5	670.2	
MONTREAL 17DEC80 NAPS NO. 59.0	1452	COARSE	562	1.7	18.1	0.0	0.1	< 4.1	< 32.9	13.2	156.2	
		FINE	563	15.1	30.6	0.0	5.7	0.0	0.0	0.0	0.0	FA
TOTAL (<15 MICROMETRES)				16.8	48.8		5.7					
MONTREAL 23DEC80 NAPS NO. 60.0	1451	COARSE	564	1.7	29.5	0.0	2.1	< 4.1	< 32.8	8.2	204.9	
		FINE	565	15.2	70.7	0.0	0.0	0.0	0.0	0.0	0.0	FA
TOTAL (<15 MICROMETRES)				16.8	100.2							
MONTREAL 29DEC80 NAPS NO. 61.0	1458	COARSE	566	1.7	25.8	0.0	0.7	< 3.6	< 29.1	4.1	121.4	
		FINE	567	15.1	46.6	0.0	13.0	< 4.5	< 36.4	16.4	1000.6	
TOTAL (<15 MICROMETRES)				16.8	72.4		13.7	< 8.2	< 65.5	20.5	1122.0	

COMMENT CODES
****

A - MISSING
C - COARSE
D - VOID
F - FINE

DICHOTOMOUS AIRBORNE PARTICULATE STUDY

SAMPLE ID	DURATION (MIN.)	FRACTION	FILTER NO.	FLOW (L/M)	MASS (UG/M3)	NITRATE (UG/M3)	SULFATE (UG/M3)	ARSENIC (NG/M3)	CADMIUM (NG/M3)	CHROMIUM (NG/M3)	LEAD (NG/M3)	COMMENTS
MONTREAL JAN4/81 NAPS NO. 1.0	1310	COARSE	672	1.7	8.7	0.0	0.6	< 5.3	< 33.5	4.3	151.3	
		FINE	673	14.4	31.4	0.0	6.6	5.3	< 42.4	4.2	412.9	
TOTAL (<15 MICROMETRES)				16.1	40.2	..	7.3	> 5.3	< 75.9	8.5	564.2	
MONTREAL 10-JAN-81 NAPS NO. 2.0	1441	COARSE	674	1.7	17.5	0.0	1.1	< 4.6	< 29.5	< 2.4	238.7	
		FINE	675	15.1	50.9	0.0	11.1	4.6	< 36.8	7.4	763.9	
TOTAL (<15 MICROMETRES)				16.8	68.4		12.2	> 4.6	< 66.3	> 7.4	1002.6	
MONTREAL JAN16/81 NAPS NO. 3.0	1448	COARSE	676	1.7	18.9	0.0	0.5	< 3.7	< 29.4	< 2.2	181.0	
		FINE	677	15.0	36.9	0.0	8.7	< 4.6	< 36.8	5.5	670.9	
TOTAL (<15 MICROMETRES)				16.7	55.8		9.2	< 8.3	< 66.2	> 5.5	851.9	
MONTREAL JAN22/81 NAPS NO. 4.0	1443	COARSE	678	1.7	23.2	0.0	2.3	< 3.7	< 29.3	< 2.6	309.3	
		FINE	679	15.2	82.6	0.0	< 0.5	< 4.6	< 36.6	9.1	951.4	
TOTAL (<15 MICROMETRES)				16.8	105.8		> 2.3	< 8.2	< 65.9	> 9.1	1260.8	
MONTREAL JAN28/81 NAPS NO. 5.0	1446	COARSE	680	1.7	88.7	0.0	1.2	< 3.7	< 29.4	1.6	229.5	
		FINE	681	15.1	21.0	0.0	4.4	< 4.6	< 36.7	9.2	513.6	
TOTAL (<15 MICROMETRES)				16.8	109.7		5.6	< 8.3	< 66.1	10.7	743.2	

COMMENT CODES
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A - MISSING
C - COARSE
D - VOID
F - FINE

Concord Scientific Corporation

DICHOTOMOUS AIRBORNE
PARTICULATE STUDY

SAMPLE ID	DURATION (MIN.)	FRACTION	FILTER NO.	FLOW (L/M)	MASS (UG/M3)	NITRATE (UG/M3)	SULFATE (UG/M3)	ARSENIC (NG/M3)	CADMIUM (NG/M3)	CHROMIUM (NG/M3)	LEAD (NG/M3)	COMMENTS
OTTAWA(ROOF) 18-SEPT-80 NAPS NO. 44.0	1412	COARSE	221	1.7	12.9	0.0	< 0.1	6.7	< 25.4	4.3	58.1	
		FINE	222	18.6	9.1	0.0	0.9	3.8	< 30.4	6.8	311.7	
		TOTAL (<15 MICROMETRES)		20.3	21.9		> 0.9	10.5	< 55.8	11.2	369.8	
OTTAWA(ROOF) 24-SEPT-80 NAPS NO. 45.0	1391	COARSE	223	1.7	18.2	0.5	0.4	6.2	< 24.8	7.1	146.0	
		FINE	224	19.6	14.3	0.1	1.7	7.3	< 29.4	4.4	382.0	
		TOTAL (<15 MICROMETRES)		21.2	32.5	0.5	2.1	13.5	< 54.2	11.5	528.0	
OTTAWA(ROOF) 30-SEPT-80 NAPS NO. 46.0	1441	COARSE	225	1.7	18.6	1.5	0.9	6.1	< 24.3	5.5	116.4	
		FINE	226	19.2	24.2	0.1	< 1.2	7.2	< 28.9	6.5	454.9	
		TOTAL (<15 MICROMETRES)		20.9	42.8	1.6	> 0.9	13.3	< 53.2	12.0	571.4	
OTTAWA(ROOF) 6-OCT-80 NAPS NO. 47.0	1440	COARSE	357	1.7	15.3	0.0	< 0.1	3.1	< 25.0	< 1.7	116.6	
		FINE	358	18.5	11.2	0.2	1.0	3.8	< 30.0	3.8	420.2	
		TOTAL (<15 MICROMETRES)		20.2	26.5		> 1.0	6.9	< 55.1	> 3.8	536.8	
OTTAWA(ROOF) 9-OCT-80 NAPS NO. 47.5	1441	COARSE	361	1.7	12.5	0.1	< 0.1	< 3.8	< 25.3	5.1	115.7	
		FINE	362	18.2	9.9	0.1	< 0.2	3.8	< 30.5	5.3	366.0	
		TOTAL (<15 MICROMETRES)		19.9	22.4	0.1	< 0.2	> 3.8	< 55.9	10.5	481.7	
OTTAWA(ROOF) 12-OCT-80 NAPS NO. 48.0	1441	COARSE	363	1.7	9.7	0.0	< 0.2	3.2	< 25.6	5.4	80.0	
		FINE	364	18.0	23.0	0.0	0.7	3.8	< 30.8	3.1	138.6	
		TOTAL (<15 MICROMETRES)		19.7	32.7		> 0.7	7.0	< 56.4	8.5	218.5	

COMMENT CODES
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A - MISSING
C - COARSE
D - VOID
F - FINE

DICHOTOMOUS AIRBORNE
PARTICULATE STUDY

SAMPLE ID	DURATION (MIN.)	FRACTION	FILTER NO.	FLOW (L/M)	MASS (UG/M3)	NITRATE (UG/M3)	SULFATE (UG/M3)	ARSENIC (NG/M3)	CADMIUM (NG/M3)	CHROMIUM (NG/M3)	LEAD (NG/M3)	COMMENTS
OTTAWA(ROOF) 15-OCT-80 NAPS NO. 48.5	1440	COARSE	367	1.7	23.4	0.2	0.2	< 3.8	< 25.2	4.4	191.2	
		FINE	368	18.3	14.7	0.1	1.0	3.8	< 30.3	5.3	621.3	
		TOTAL (<15 MICROMETRES)		20.0	38.1	0.3	1.1	> 3.8	< 55.6	9.7	812.5	
OTTAWA(ROOF) 18-OCT-80 NAPS NO. 49.0	1440	COARSE	371	1.7	15.9	0.2	< 0.7	< 3.2	< 25.7	2.5	87.8	
		FINE	372	17.9	17.1	0.2	6.2	< 3.9	< 31.0	3.9	217.0	
		TOTAL (<15 MICROMETRES)		19.6	33.0	0.4	> 6.2	< 7.1	< 56.7	6.4	304.9	
OTTAWA(ROOF) 21-OCT-80 NAPS NO. 49.5	1441	COARSE	375	1.7	15.1	0.1	1.3	3.9	< 25.7	1.1	520.6	
		FINE	376	17.9	15.1	0.1	1.8	< 3.9	< 31.0	3.9	209.1	
		TOTAL (<15 MICROMETRES)		19.6	30.3	0.2	3.0	> 3.9	< 56.7	5.0	729.7	
OTTAWA(ROOF) 24-OCT-80 NAPS NO. 50.0	1440	COARSE	379	1.6	18.8	0.0	< 0.7	< 3.2	< 25.7	3.3	184.5	
		FINE	380	18.0	16.5	0.8	1.2	< 3.8	< 30.8	2.3	585.1	
		TOTAL (<15 MICROMETRES)		19.7	35.3	0.8	> 1.2	< 7.1	< 56.5	5.6	769.6	
OTTAWA(ROOF) 27-OCT-80 NAPS NO. 50.5	1441	COARSE	383	1.7	16.1	0.1	< 0.7	< 3.8	< 25.6	3.3	145.9	
		FINE	384	18.0	13.8	0.1	1.5	3.8	< 30.8	2.3	438.5	
		TOTAL (<15 MICROMETRES)		19.7	30.0	0.2	> 1.5	> 3.8	< 56.3	5.6	584.5	
OTTAWA(ROOF) 30-OCT-80 NAPS NO. 51.0	1443	COARSE	389	1.7	20.6	0.1	< 0.5	< 3.8	< 25.3	3.6	157.1	
		FINE	390	18.2	10.2	0.3	2.2	3.8	< 30.4	< 1.5	372.7	
		TOTAL (<15 MICROMETRES)		19.9	30.9	0.4	> 2.2	> 3.8	< 55.8	> 3.6	529.9	

COMMENT CODES
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A - MISSING
C - COARSE
D - VOID
F - FINE

Concord Scientific Corporation

DICHOTOMOUS AIRBORNE PARTICULATE STUDY

SAMPLE ID	DURATION (MIN.)	FRACTION	FILTER NO.	FLOW (L/M)	MASS (UG/M3)	NITRATE (UG/M3)	SULFATE (UG/M3)	ARSENIC (NG/M3)	CADMIUM (NG/M3)	CHROMIUM (NG/M3)	LEAD (NG/M3)	COMMENTS
OTTAWA(ROOF)												
2-NOV-80												
NAPS NO. 51.5	1441	COARSE	395	1.7	7.9	0.1	0.1	< 3.9	< 25.5	3.1	139.9	
		FINE	396	18.0	14.4	0.2	1.7	3.9	< 30.8	5.4	501.2	
TOTAL (<15 MICROMETRES)				19.7	22.3	0.3	1.8	> 3.9	< 56.4	8.5	641.1	
OTTAWA(ROOF)												
5-NOV-80												
NAPS NO. 52.0	1441	COARSE	475	1.7	39.9	0.1	0.4	< 3.2	< 25.6	6.1	93.8	
		FINE	476	18.0	15.9	0.4	1.9	< 3.8	< 30.8	10.8	223.1	
TOTAL (<15 MICROMETRES)				19.7	55.8	0.5	2.4	< 7.0	< 56.3	16.9	316.9	
OTTAWA(ROOF)												
8-NOV-80												
NAPS NO. 52.5	1440	COARSE	479	1.7	14.1	0.3	0.9	< 3.2	< 25.8	7.1	137.0	
		FINE	480	17.9	13.6	0.3	1.7	< 3.9	< 31.0	7.7	309.7	
TOTAL (<15 MICROMETRES)				19.6	27.7	0.6	2.6	< 7.1	< 56.7	14.9	446.7	
OTTAWA(ROOF)												
11-NOV-80												
NAPS NO. 53.0	1440	COARSE	483	1.7	11.9	0.0	< 0.1	< 3.2	< 25.3	7.6	85.5	
		FINE	484	18.2	7.6	0.0	1.3	< 3.8	< 30.5	9.2	145.1	
TOTAL (<15 MICROMETRES)				19.9	19.5	..	> 1.3	< 7.0	< 55.9	16.8	230.6	
OTTAWA(ROOF)												
14-NOV-80												
NAPS NO. 53.5	1441	COARSE	487	1.7	11.4	0.2	0.8	< 3.2	< 25.7	5.2	25.2	
		FINE	488	17.9	17.4	0.2	2.8	< 3.9	< 31.0	5.4	371.6	
TOTAL (<15 MICROMETRES)				19.6	28.8	0.4	3.6	< 7.1	< 56.7	10.6	396.8	
OTTAWA(ROOF)												
17-NOV-80												
NAPS NO. 54.0	1442	COARSE	491	1.7	37.6	0.8	0.9	3.5	< 27.9	< 1.4	432.6	
		FINE	492	18.2	26.7	0.0	0.0	0.0	0.0	0.0	0.0	FA
TOTAL (<15 MICROMETRES)				19.9	64.3			.	.	0	432.6	

COMMENT CODES
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A - MISSING	D - VOID
C - COARSE	F - FINE

DICHOTOMOUS AIRBORNE PARTICULATE STUDY

SAMPLE ID	DURATION (MIN.)	FRACTION	FILTER NO.	FLOW (L/M)	MASS (UG/M3)	NITRATE (UG/M3)	SULFATE (UG/M3)	ARSENIC (NG/M3)	CADMIUM (NG/M3)	CHROMIUM (NG/M3)	LEAD (NG/M3)	COMMENTS
OTTAWA(ROOF) 20-NOV-80 NAPS NO. 54.5	1442	COARSE	499	1.7	17.6	1.9	0.5	< 3.2	< 25.5	1.4	141.3	
		FINE	500	18.0	33.3	6.3	4.2	< 3.8	< 30.8	8.5	492.0	
		TOTAL (<15 MICROMETRES)		19.7	50.9	8.2	4.8	< 7.0	< 56.3	9.9	633.3	
OTTAWA(ROOF) 23-NOV-80 NAPS NO. 55.0	1441	COARSE	503	1.7	18.4	0.6	0.5	< 3.8	< 25.6	7.0	195.0	
		FINE	504	18.0	29.8	3.4	4.8	3.8	< 30.8	9.2	607.8	
		TOTAL (<15 MICROMETRES)		19.7	48.2	4.0	5.3	> 3.8	< 56.3	16.2	802.8	
OTTAWA(ROOF) 26-NOV-80 NAPS NO. 55.5	1442	COARSE	509	1.7	22.8	0.3	< 0.6	2.9	< 25.5	6.3	182.5	
		FINE	510	18.0	22.6	0.0	1.0	7.7	< 30.8	16.9	753.5	
		TOTAL (<15 MICROMETRES)		19.7	45.3		> 1.0	10.6	< 56.3	23.2	935.9	
OTTAWA(ROOF) 29-NOV-80 NAPS NO. 56.0	1440	COARSE	511	1.7	10.3	1.4	0.9	< 3.2	< 25.8	9.4	73.3	
		FINE	512	17.9	14.7	0.0	4.0	< 3.9	< 31.0	6.2	224.5	
		TOTAL (<15 MICROMETRES)		19.6	25.0	[illegible]	4.9	< 7.1	< 56.7	15.6	297.8	
OTTAWA(ROOF) 5-DEC-80 NAPS NO. 57.0	1440	COARSE	589	1.7	10.2	0.0	0.7	< 3.2	< 25.4	6.0	105.6	
		FINE	590	18.2	18.1	0.0	4.8	< 3.8	< 30.5	< 5.3	327.6	
		TOTAL (<15 MICROMETRES)		19.9	28.3		5.5	< 7.0	< 55.9	> 6.0	433.2	
OTTAWA(ROOF) 11-DEC-80 NAPS NO. 58.0	1439	COARSE	593	1.6	9.3	0.0	< 0.4	< 3.2	< 25.8	1.5	129.7	
		FINE	594	18.0	20.3	0.0	3.7	< 3.9	< 31.0	< 1.5	572.7	
		TOTAL (<15 MICROMETRES)		19.6	29.7		> 3.7	< 7.1	< 56.8	> 1.5	702.4	

COMMENT CODES
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A - MISSING
C - COARSE
D - VOID
F - FINE

Concord Scientific Corporation

DICHOTOMOUS AIRBORNE PARTICULATE STUDY

SAMPLE ID	DURATION (MIN.)	FRACTION	FILTER NO.	FLOW (L/M)	MASS (UG/M3)	NITRATE (UG/M3)	SULFATE (UG/M3)	ARSENIC (NG/M3)	CADMIUM (NG/M3)	CHROMIUM (NG/M3)	LEAD (NG/M3)	COMMENTS
OTTAWA(ROOF)												
17-DEC-80												
NAPS NO. 59.0	1440	COARSE	597	1.7	12.6	0.0	0.4	< 3.2	< 25.4	1.5	166.6	
		FINE	598	18.2	23.9	0.0	2.1	< 3.8	< 30.5	< 1.5	594.9	
TOTAL (<15 MICROMETRES)				19.9	36.5	.	2.5	< 7.0	< 55.9	> 1.5	761.5	
OTTAWA(ROOF)												
23-DEC-80												
NAPS NO. 60.0	1440	COARSE	601	1.7	39.4	0.0	4.3	< 3.8	< 30.4	< 1.5	410.1	
		FINE	602	16.6	63.6	0.0	0.0	0.0	0.0	0.0	0.0	FA
TOTAL (<15 MICROMETRES)				18.3	103.0							
OTTAWA(ROOF)												
29-DEC-80												
NAPS NO. 61.0	1440	COARSE	603	1.7	10.2	0.0	2.1	< 3.9	< 25.7	< 1.7	117.5	
		FINE	604	17.9	38.3	0.0	7.0	3.9	< 31.0	3.1	534.8	
TOTAL (<15 MICROMETRES)				19.6	48.5		9.1	> 3.9	< 56.7	> 3.1	652.3	
OTTAWA(ROOF)												
4-JAN-81												
NAPS NO. 1.0	800	COARSE	711	1.7	2.2	0.0	0.0	0.0	0.0	0.0	0.0	
		FINE	712	18.0	4.2	0.0	0.0	0.0	0.0	0.0	0.0	A
TOTAL (<15 MICROMETRES)				19.7	6.5							
OTTAWA(ROOF)												
10-JAN-81												
NAPS NO. 2.0	1440	COARSE	713	1.7	16.3	0.0	0.4	2.2	< 25.4	6.3	78.6	
		FINE	715	18.2	28.1	0.0	10.7	15.3	< 30.5	7.6	228.8	
TOTAL (<15 MICROMETRES)				19.9	44.4		11.1	17.5	< 55.9	14.0	307.4	
OTTAWA(ROOF)												
16-JAN-81												
NAPS NO. 3.0	1441	COARSE	716	1.7	16.3	0.0	0.5	< 3.8	< 25.4	5.0	91.7	
		FINE	717	18.2	35.9	0.0	8.6	3.8	< 30.5	< 1.5	487.8	
TOTAL (<15 MICROMETRES)				19.9	52.2		9.1	> 3.8	< 55.9	> 5.0	579.5	

COMMENT CODES
****

A - MISSING
C - COARSE
D - VOID
F - FINE

DICHOTOMOUS AIRBORNE
PARTICULATE STUDY

SAMPLE ID	DURATION (MIN.)	FRACTION	FILTER NO.	FLOW (L/M)	MASS (UG/M3)	NITRATE (UG/M3)	SULFATE (UG/M3)	ARSENIC (NG/M3)	CADMIUM (NG/M3)	CHROMIUM (NG/M3)	LEAD (NG/M3)	COMMENTS
OTTAWA(ROOF) 22-JAN-81 NAPS NO. 4.0	1439	COARSE	718	1.7	19.6	0.0	1.9	< 3.2	< 25.3	4.3	125.6	
		FINE	719	18.3	32.9	0.0	7.4	< 3.8	< 30.3	< 1.5	409.5	
TOTAL (<15 MICROMETRES)				20.0	52.5		9.2	< 6.9	< 55.6	> 4.3	535.1	
OTTAWA(ROOF) 28-JAN-81 NAPS NO. 5.0	1441	COARSE	722	1.7	31.1	0.0	0.8	< 3.2	< 25.4	3.9	131.1	
		FINE	723	18.2	22.8	0.0	4.3	< 3.8	< 30.5	3.8	350.6	
TOTAL (<15 MICROMETRES)				19.9	53.9	0	5.1	< 7.0	< 55.9	7.7	481.7	

COMMENT CODES
****

A - MISSING
C - COARSE

D - VOID
F - FINE

DICHOTOMOUS AIRBORNE PARTICULATE STUDY

SAMPLE ID	DURATION (MIN.)	FRACTION	FILTER NO.	FLOW (L/M)	MASS (UG/M3)	NITRATE (UG/M3)	SULFATE (UG/M3)	ARSENIC (NG/M3)	CADMIUM (NG/M3)	CHROMIUM (NG/M3)	LEAD (NG/M3)	COMMENTS
OTTAWA(CURB) 9-OCT-80 NAPS NO. 47.5	1422	COARSE	359	1.8	18.3	0.1	< 0.1	< 3.7	< 24.4	4.3	90.4	
		FINE	360	19.2	9.2	0.1	< 0.1	3.7	< 29.3	4.4	278.8	
TOTAL (<15 MICROMETRES)				21.0	27.4	0.2	< 0.3	> 3.7	< 53.7	8.7	369.2	
OTTAWA(CURB) 12-OCT-80 NAPS NO. 48.0	1444	COARSE	365	1.8	11.6	0.0	< 0.2	3.1	< 24.7	3.0	59.1	
		FINE	366	18.6	20.1	0.0	0.3	3.7	< 29.8	5.2	104.3	
TOTAL (<15 MICROMETRES)				20.4	31.8		> 0.3	6.8	< 54.4	8.2	163.3	
OTTAWA(CURB) 15-OCT-80 NAPS NO. 48.5	1446	COARSE	369	1.8	26.2	0.1	0.2	3.0	< 24.2	7.5	233.2	
		FINE	370	19.0	15.6	0.2	0.6	3.6	< 29.2	< 1.5	874.9	
TOTAL (<15 MICROMETRES)				20.7	41.9	0.3	0.7	6.7	< 53.4	> 7.5	1108.1	
OTTAWA(CURB) 18-OCT-80 NAPS NO. 49.0	1444	COARSE	373	1.8	12.2	0.3	< 0.6	< 4.6	< 29.1	1.8	81.1	
		FINE	374	15.0	18.4	0.0	4.1	4.6	< 36.8	6.4	248.6	
TOTAL (<15 MICROMETRES)				16.8	30.6		> 4.1	> 4.6	< 66.0	8.2	329.8	
OTTAWA(CURB) 21-OCT-80 NAPS NO. 49.5	1444	COARSE	377	1.7	9.8	0.1	< 0.3	< 3.9	< 31.3	4.7	109.5	
		FINE	378	16.0	4.3	0.0	0.0	0.0	0.0	0.0	0.0	FA
TOTAL (<15 MICROMETRES)				17.7	14.1							
OTTAWA(CURB) 24-OCT-80 NAPS NO. 50.0	1442	COARSE	381	1.8	26.8	0.6	2.4	4.9	< 30.3	3.0	267.8	
		FINE	382	14.3	24.1	0.9	< 0.8	< 4.9	< 38.9	3.9	865.6	
TOTAL (<15 MICROMETRES)				16.0	50.9	1.5	> 2.4	> 4.9	< 69.2	6.9	1133.5	

COMMENT CODES
****

A - MISSING
C - COARSE
D - VOID
F - FINE

DICHOTOMOUS AIRBORNE PARTICULATE STUDY

SAMPLE ID	DURATION (MIN.)	FRACTION	FILTER NO.	FLOW (L/M)	MASS (UG/M3)	NITRATE (UG/M3)	SULFATE (UG/M3)	ARSENIC (NG/M3)	CADMIUM (NG/M3)	CHROMIUM (NG/M3)	LEAD (NG/M3)	COMMENTS
OTTAWA(CURB) 27-OCT-80 NAPS NO. 50.5	1443	COARSE	385	1.6	20.4	0.3	1.9	< 3.9	< 31.0	< 2.0	205.3	
		FINE	386	14.2	15.2	0.1	1.8	< 4.9	< 39.2	2.0	558.3	
		TOTAL (<15 MICROMETRES)		15.8	35.5	0.4	3.7	< 8.8	< 70.2	> 2.0	763.7	
OTTAWA(CURB) 30-OCT-80 NAPS NO. 51.0	1442	COARSE	393	1.7	22.7	0.3	1.2	< 3.9	< 30.8	< 2.1	266.7	
		FINE	394	14.2	19.8	0.2	< 0.4	< 4.9	< 39.0	2.9	702.8	
		TOTAL (<15 MICROMETRES)		15.9	42.5	0.5	> 1.2	< 8.7	< 69.9	> 2.9	969.5	
OTTAWA(CURB) 2-NOV-80 NAPS NO. 51.5	1444	COARSE	397	1.7	12.7	0.0	< 0.5	< 4.0	< 31.8	4.0	186.8	
		FINE	474	13.6	15.3	0.0	2.6	< 5.1	< 40.9	5.1	531.1	
		TOTAL (<15 MICROMETRES)		15.2	28.0		> 2.6	< 9.1	< 72.7	9.1	718.0	
OTTAWA(CURB) 5-NOV-80 NAPS NO. 52.0	1445	COARSE	477	1.7	25.7	0.4	0.8	< 4.0	< 31.9	8.1	69.6	
		FINE	478	13.6	14.7	0.2	1.4	< 5.1	< 40.9	9.2	194.1	
		TOTAL (<15 MICROMETRES)		15.2	40.4	0.6	2.2	< 9.1	< 72.8	17.3	263.7	
OTTAWA(CURB) 8-NOV-80 NAPS NO. 52.5	1444	COARSE	481	1.6	13.7	0.1	0.4	< 4.0	< 32.2	10.5	139.8	
		FINE	482	13.5	14.7	0.3	1.7	< 5.1	< 41.1	13.4	401.0	
		TOTAL (<15 MICROMETRES)		15.1	28.4	0.4	2.1	< 9.2	< 73.3	23.8	540.8	
OTTAWA(CURB) 11-NOV-80 NAPS NO. 53.0	1443	COARSE	485	1.7	14.1	0.0	0.2	< 4.0	< 31.9	< 2.6	33.1	
		FINE	486	13.5	9.6	0.[illegible]	0.8	< 5.1	< 41.0	7.2	112.8	
		TOTAL (<15 MICROMETRES)		15.2	23.7	[illegible]	1.0	< 9.1	< 72.9	> 7.2	145.9	

COMMENT CODES
****

A - MISSING
C - COARSE
D - VOID
F - FINE

DICHOTOMOUS AIRBORNE PARTICULATE STUDY

SAMPLE ID	DURATION (MIN.)	FRACTION	FILTER NO.	FLOW (L/M)	MASS (UG/M3)	NITRATE (UG/M3)	SULFATE (UG/M3)	ARSENIC (NG/M3)	CADMIUM (NG/M3)	CHROMIUM (NG/M3)	LEAD (NG/M3)	COMMENTS
OTTAWA(CURB)												
14-NOV-80												
NAPS NO. 53.5	1443	COARSE	489	1.7	8.2	0.1	0.2	< 4.0	< 31.7	2.7	117.9	
		FINE	490	13.6	19.1	0.1	2.1	< 5.1	< 40.6	8.1	406.5	
TOTAL (<15 MICROMETRES)				15.3	27.3	0.2	2.4	< 9.0	< 72.3	10.8	524.4	
OTTAWA(CURB)												
17-NOV-80												
NAPS NO. 54.0	1431	COARSE	493	1.7	46.9	1.1	0.0	< 5.7	< 32.2	9.3	403.5	
		FINE	494	13.6	30.4	0.5	3.0	10.3	< 41.2	7.2	1338.9	CA
TOTAL (<15 MICROMETRES)				15.2	77.3	1.7	..	> 10.3	< 73.4	16.5	1742.4	
OTTAWA(CURB)												
20-NOV-80												
NAPS NO. 54.5	1445	COARSE	501	1.6	28.9	1.6	1.0	< 4.0	< 31.8	7.8	235.3	
		FINE	502	13.7	41.5	0.2	5.2	< 5.1	< 40.4	11.1	839.1	
TOTAL (<15 MICROMETRES)				15.3	70.3	1.8	6.1	< 9.0	< 72.2	19.0	1074.4	
OTTAWA(CURB)												
23-NOV-80												
NAPS NO. 55.0	1445	COARSE	505	1.7	26.0	0.5	0.9	< 4.0	< 31.9	4.4	218.1	
		FINE	506	13.6	31.0	2.1	4.4	< 5.1	< 40.8	9.2	744.6	
TOTAL (<15 MICROMETRES)				15.2	57.0	2.6	5.3	< 9.1	< 72.7	13.6	962.7	
OTTAWA(CURB)												
26-NOV-80												
NAPS NO. 55.5	1445	COARSE	507	1.7	26.6	< 0.3	0.4	3.4	< 31.9	7.0	200.3	
		FINE	508	13.5	24.8	2.3	5.0	10.2	< 40.9	11.3	828.6	
TOTAL (<15 MICROMETRES)				15.2	51.4	> 2.3	5.4	13.7	< 72.8	18.2	1029.0	
OTTAWA(CURB)												
29-NOV-80												
NAPS NO. 56.0	1444	COARSE	513	1.7	12.1	1.3	0.2	< 4.0	< 31.9	8.6	83.6	
		FINE	514	13.5	18.7	1.1	3.1	< 5.1	< 40.9	13.3	317.3	
TOTAL (<15 MICROMETRES)				15.2	30.8	2.5	3.2	< 9.1	< 72.9	21.9	400.9	

COMMENT CODES
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A - MISSING
C - COARSE
D - VOID
F - FINE

DICHOTOMOUS AIRBORNE PARTICULATE STUDY

SAMPLE ID	DURATION (MIN.)	FRACTION	FILTER NO.	FLOW (L/M)	MASS (UG/M3)	NITRATE (UG/M3)	SULFATE (UG/M3)	ARSENIC (NG/M3)	CADMIUM (NG/M3)	CHROMIUM (NG/M3)	LEAD (NG/M3)	COMMENTS
TORONTO(ROOF)												
18SEPT80												
NAPS NO. 44.0	1465	COARSE	214	1.7	23.5	0.0	< 0.3	7.3	< 29.1	6.3	85.4	
		FINE	215	15.0	12.6	0.0	1.8	9.1	< 36.3	2.7	208.9	
TOTAL (<15 MICROMETRES)				16.7	36.1		> 1.8	16.3	< 65.4	9.0	294.3	
TORONTO(ROOF)												
24SEPT80												
NAPS NO. 45.0	800	COARSE	216	1.7	15.2	0.0	0.0	0.0	0.0	0.0	0.0	
		FINE	217	10.0	15.4	0.0	0.0	0.0	0.0	0.0	0.0	A
TOTAL (<15 MICROMETRES)				11.7	30.5							
TORONTO(ROOF)												
30SEPT80												
NAPS NO. 46.0	1430	COARSE	218	1.7	33.4	0.0	< 1.5	3.3	< 29.8	8.4	112.6	
		FINE	219	15.0	38.2	0.3	15.2	9.3	< 37.2	8.4	800.3	
TOTAL (<15 MICROMETRES)				16.7	71.5		> 15.2	12.6	< 67.0	16.7	912.9	
TORONTO(ROOF)												
6OCT80												
NAPS NO. 47.0	1427	COARSE	220	1.7	17.8	0.3	< 0.7	3.3	< 29.8	0.4	359.0	
		FINE	324	15.0	18.0	0.3	3.7	9.3	< 37.3	< 3.7	270.4	
TOTAL (<15 MICROMETRES)				16.7	35.8	0.6	> 3.7	12.6	< 67.1	> 0.4	629.4	
TORONTO(ROOF)												
9OCT80												
NAPS NO. 47.5	1448	COARSE	325	1.7	10.2	0.2	< 0.1	3.2	< 12.8	0.0	66.8	
		FINE	326	15.0	7.5	0.1	1.2	9.2	< 36.8	0.0	239.3	A
TOTAL (<15 MICROMETRES)				16.7	17.7	0.3	> 1.2	12.4	< 49.6		306.0	
TORONTO(ROOF)												
12-OCT-80												
NAPS NO. 48.0	1455	COARSE	327	1.7	11.5	0.0	0.0	4.1	< 32.9	0.0	< 32.9	
		FINE	328	15.0	0.0	0.0	< 0.5	0.0	0.0	0.0	0.0	A
TOTAL (<15 MICROMETRES)				16.7	11.4							

COMMENT CODES
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A - MISSING
C - COARSE

D - VOID
F - FINE

DICHOTOMOUS AIRBORNE PARTICULATE STUDY

SAMPLE ID	DURATION (MIN.)	FRACTION	FILTER NO.	FLOW (L/M)	MASS (UG/M3)	NITRATE (UG/M3)	SULFATE (UG/M3)	ARSENIC (NG/M3)	CADMIUM (NG/M3)	CHROMIUM (NG/M3)	LEAD (NG/M3)	COMMENTS
TORONTO(ROOF)												
15OCT80												
NAPS NO. 48.5	1457	COARSE	329	1.7	21.7	0.6	< 0.3	3.7	< 29.3	9.7	79.8	
		FINE	330	15.1	16.9	0.3	1.2	4.6	< 36.5	18.2	273.6	
		TOTAL (<15 MICROMETRES)		16.7	38.6	0.9	> 1.2	8.2	< 65.8	27.9	353.4	
TORONTO(ROOF)												
18OCT80												
NAPS NO. 49.0	1455	COARSE	331	1.7	18.3	0.1	< 0.3	< 3.7	< 29.3	16.8	33.8	
		FINE	332	15.0	16.0	0 0	1.2	< 4.6	< 36.6	< 3.7	155.5	
		TOTAL (<15 MICROMETRES)		16.7	34.3		> 1.2	< 8.2	< 65.8	> 16.8	189.3	
TORONTO(ROOF)												
21OCT80												
NAPS NO. 49.5	1455	COARSE	333	1.7	16.0	0.1	< 0.3	3.7	< 29.3	5.5	96.0	
		FINE	334	15.0	20.6	0.5	1.7	4.6	< 36.6	11.0	356.7	
		TOTAL (<15 MICROMETRES)		16.7	36.5	0.6	> 1.7	8.2	< 65.8	16.5	452.7	
TORONTO(ROOF)												
24OCT80												
NAPS NO. 50.0	1438	COARSE	335	1.6	24.8	0.4	< 0.1	3.7	< 29.9	5.2	119.8	
		FINE	336	14.9	16.6	0.1	< 0.2	4.7	< 37.3	6.5	233.2	
		TOTAL (<15 MICROMETRES)		16.6	41.4	0.5	< 0.4	8.4	< 67.2	11.8	353.0	
TORONTO(ROOF)												
27OCT80												
NAPS NO. 50.5	1437	COARSE	337	1.7	15.6	0.5	< 1.3	< 3.7	< 29.6	7.7	99.8	
		FINE	338	15.0	18.7	1.6	2.9	< 4.6	< 37.1	6.5	250.2	
		TOTAL (<15 MICROMETRES)		16.7	34.3	2.1	> 2.9	< 8.3	< 66.7	14.2	350.0	
TORONTO(ROOF)												
30OCT80												
NAPS NO. 51.0	1438	COARSE	398	1.7	14.4	0.7	0.4	< 3.7	< 29.5	4.5	260.5	
		FINE	399	15.0	13.0	1.1	2.5	< 4.6	< 37.0	4.6	138.8	
		TOTAL (<15 MICROMETRES)		16.7	27.5	1.8	2.9	< 8.3	< 66.5	9.2	399.3	

COMMENT CODES
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A - MISSING	D - VOID
C - COARSE	F - FINE

Concord Scientific Corporation

DICHOTOMOUS AIRBORNE PARTICULATE STUDY

SAMPLE ID	DURATION (MIN.)	FRACTION	FILTER NO.	FLOW (L/M)	MASS (UG/M3)	NITRATE (UG/M3)	SULFATE (UG/M3)	ARSENIC (NG/M3)	CADMIUM (NG/M3)	CHROMIUM (NG/M3)	LEAD (NG/M3)	COMMENTS
EDMONTON 29-NOV-80 NAPS NO. 56.0	1406	COARSE	460	1.7	55.8	< 0.2	< 1.5	< 3.5	< 28.3	9.3	212.9	
		FINE	461	16.4	24.0	1.9	2.1	< 4.3	< 34.8	10.4	425.8	
		TOTAL (<15 MICROMETRES)		18.0	79.8	> 1.9	> 2.1	< 7.9	< 63.1	19.7	638.7	
EDMONTON 5-DEC-80 NAPS NO. 57.0	1393	COARSE	618	1.7	28.1	0.0	0.8	< 3.6	< 32.4	12.0	213.0	
		FINE	619	16.4	30.0	0.0	3.4	< 4.4	6.1	< 35.1	622.7	
		TOTAL (<15 MICROMETRES)		18.0	58.1		4.2	< 8.0	> 6.1	> 12.0	835.7	
EDMONTON 11-DEC-80 NAPS NO. 58.0	1401	COARSE	620	1.7	17.8	0.0	0.6	< 3.6	< 28.4	10.1	277.8	
		FINE	621	16.4	5.8	0.0	3.4	< 4.4	< 34.9	10.5	845.9	
		TOTAL (<15 MICROMETRES)		18.0	23.6		4.0	< 7.9	< 63.3	20.6	1123.7	
EDMONTON 17-DEC-80 NAPS NO. 59.0	1405	COARSE	622	1.7	65.7	0.0	0.6	< 3.5	< 28.3	9.3	205.5	
		FINE	623	16.4	12.2	0.0	0.7	< 4.3	< 34.8	10.4	252.2	
		TOTAL (<15 MICROMETRES)		18.0	77.9		1.3	< 7.9	< 63.1	19.7	457.7	
EDMONTON 23-DEC-80 NAPS NO. 60.0	1409	COARSE	626	1.7	13.7	0.0	0.5	< 3.9	< 31.5	10.2	259.7	
		FINE	627	16.4	42.1	0.0	0.0	0.0	0.0	0.0	0.0	FA
		TOTAL (<15 MICROMETRES)		18.0	55.7							
EDMONTON 29-DEC-80 NAPS NO. 61.0	1403	COARSE	628	1.7	16.6	0.0	0.4	< 3.5	< 28.4	7.7	170.3	
		FINE	629	16.4	20.1	0.0	0.6	< 4.4	< 34.8	10.4	635.7	
		TOTAL (<15 MICROMETRES)		18.0	36.6		1.0	< 7.9	< 63.2	18.2	806.0	

COMMENT CODES
****

A - MISSING
D - VOID
C - COARSE
F - FINE

DICHOTOMOUS AIRBORNE PARTICULATE STUDY

SAMPLE ID	DURATION (MIN.)	FRACTION	FILTER NO.	FLOW (L/M)	MASS (UG/M3)	NITRATE (UG/M3)	SULFATE (UG/M3)	ARSENIC (NG/M3)	CADMIUM (NG/M3)	CHROMIUM (NG/M3)	LEAD (NG/M3)	COMMENTS
EDMONTON 4-JAN-81 NAPS NO. 1.0	660	COARSE	660	1.7	49.0	0.0	0.0	0.0	0.0	0.0	0.0	
		FINE	661	16.4	0.0	0.0	< 3.7	0.0	0.0	0.0	0.0	D
TOTAL (<15 MICROMETRES)				18.0								
EDMONTON 10-JAN-81 NAPS NO. 2.0	1566	COARSE	662	1.7	21.3	0.0	1.1	< 3.2	< 25.4	6.7	174.8	
		FINE	663	16.4	37.1	0.0	2.7	< 3.9	< 31.2	3.9	405.7	
TOTAL (<15 MICROMETRES)				18.0	58.4		3.8	< 7.1	< 56.6	10.6	580.5	
EDMONTON 16-JAN-81 NAPS NO. 3.0	1470	COARSE	664	1.7	25.5	0.0	1.2	< 3.4	< 27.1	7.3	141.0	
		FINE	665	16.4	45.6	0.0	< 0.5	< 4.2	< 33.2	2.5	432.2	
TOTAL (<15 MICROMETRES)				18.0	71.1		> 1.2	< 7.5	< 60.3	9.8	573.2	
EDMONTON 22-JAN-81 NAPS NO. 4.0	1470	COARSE	668	1.7	37.4	0.0	0.6	< 3.4	< 27.1	7.7	302.9	
		FINE	669	16.4	41.8	0.0	2.3	< 4.2	< 33.2	< 1.7	964.1	
TOTAL (<15 MICROMETRES)				18.0	79.2		2.9	< 7.5	< 60.3	> 7.7	1267.0	
EDMONTON 28-JAN-81 NAPS NO. 5.0	1450	COARSE	670	1.7	27.2	0.0	1.9	< 3.4	< 27.5	< 1.4	115.0	
		FINE	671	16.4	26.0	0.0	2.6	< 4.2	< 33.7	< 1.7	244.3	
TOTAL (<15 MICROMETRES)				18.0	53.2		4.5	< 7.6	< 61.2	< 3.1	359.4	

COMMENT CODES
****

A - MISSING
C - COARSE
D - VOID
F - FINE

DICHOTOMOUS AIRBORNE PARTICULATE STUDY

SAMPLE ID	DURATION (MIN.)	FRACTION	FILTER NO.	FLOW (L/M)	MASS (UG/M3)	NITRATE (UG/M3)	SULFATE (UG/M3)	ARSENIC (NG/M3)	CADMIUM (NG/M3)	CHROMIUM (NG/M3)	LEAD (NG/M3)	COMMENTS
VANCOUVER 18SEPT80 NAPS NO. 44.0	1445	COARSE	242	1.7	21.9	0.7	0.6	10.4	< 29.6	5.6	134.7	
		FINE	243	14.9	26.8	0.3	5.7	4.6	< 37.1	10.2	815.8	
TOTAL (<15 MICROMETRES)				16.6	48.7	1.0	6.3	15.0	< 66.7	15.8	950.5	
VANCOUVER 24SEPT80 NAPS NO. 45.0	764	COARSE	244	1.7	28.6	0.1	1.0	6.9	< 55.0	9.6	224.0	
		FINE	245	15.3	27.0	0.2	1.2	8.6	< 68.5	12.0	548.2	
TOTAL (<15 MICROMETRES)				17.0	55.6	0.3	2.2	15.4	<123.6	21.6	772.2	
VANCOUVER 6OCT80 NAPS NO. 47.0	1396	COARSE	247	1.7	35.5	1.7	1.1	3.8	< 30.5	0.4	338.4	
		FINE	248	15.0	39.2	1.2	6.0	4.8	< 38.1	< 3.8	1334.5	
TOTAL (<15 MICROMETRES)				16.7	74.7	2.9	7.1	8.6	< 68.6	> 0.4	1672.9	
VANCOUVER 12OCT80 NAPS NO. 48.0	1434	COARSE	249	1.7	11.5	0.7	1.5	3.7	< 29.7	0.0	119.7	
		FINE	250	15.0	17.6	0.2	1.9	4.6	< 37.1	0.0	389.7	A
TOTAL (<15 MICROMETRES)				16.7	29.1	0.9	3.3	8.4	< 66.8		509.4	
VANCOUVER 18OCT80 NAPS NO. 49.0	1383	COARSE	251	1.7	19.6	1.3	0.8	3.8	< 30.8	< 1.9	201.1	
		FINE	252	15.0	39.2	0.6	6.9	4.8	< 38.5	19.2	760.1	
TOTAL (<15 MICROMETRES)				16.7	58.8	1.9	7.7	8.7	< 69.3	> 19.2	961.2	
VANCOUVER 24OCT80 NAPS NO. 50.0	944	COARSE	253	1.7	17.1	0.3	0.3	< 7.1	< 45.3	< 5.7	< 135.3	
		FINE	254	14.9	42.9	1.0	3.3	7.1	< 56.8	56.8	837.2	
TOTAL (<15 MICROMETRES)				16.6	60.0	1.3	3.5	> 7.1	<102.1	> 56.8	> 837.2	

COMMENT CODES
****

A - MISSING
C - COARSE

D - VOID
F - FINE

Concord Scientific Corporation

DICHOTOMOUS AIRBORNE PARTICULATE STUDY

SAMPLE ID	DURATION (MIN.)	FRACTION	FILTER NO.	FLOW (L/M)	MASS (UG/M3)	NITRATE (UG/M3)	SULFATE (UG/M3)	ARSENIC (NG/M3)	CADMIUM (NG/M3)	CHROMIUM (NG/M3)	LEAD (NG/M3)	COMMENTS
VANCOUVER 30OCT80 NAPS NO. 51.0	1448	COARSE	256	1.7	39.9	1.0	2.2	3.7	< 29.4	< 5.5	406.2	
		FINE	257	15.0	65.1	5.4	9.2	4.6	< 36.8	55.1	1562.3	
		TOTAL (<15 MICROMETRES)		16.7	105.0	6.3	11.4	8.3	< 66.2	> 55.1	1968.4	
VANCOUVER 5NOV80 NAPS NO. 52.0	1421	COARSE	258	1.7	20.5	0.4	0.2	3.7	< 29.6	< 1.8	200.1	
		FINE	259	15.3	24.0	0.0	2.2	4.6	< 36.8	18.4	754.8	
		TOTAL (<15 MICROMETRES)		17.0	44.5		2.4	8.3	< 66.4	> 18.4	954.9	
VANCOUVER 11NOV80 NAPS NO. 53.0	1439	COARSE	260	1.7	18.7	0.0	3.2	3.7	< 29.2	8.1	243.6	
		FINE	261	15.3	24.7	0.3	2.8	4.5	< 36.4	18.2	527.2	
		TOTAL (<15 MICROMETRES)		17.0	43.5		6.0	8.2	< 65.6	26.2	770.8	
VANCOUVER 17NOV80 NAPS NO. 54.0	1469	COARSE	262	1.7	14.5	0.2	0.4	3.6	< 28.6	0.0	157.9	
		FINE	263	15.3	22.8	0.2	1.9	4.5	< 35.6	0.0	516.8	A
		TOTAL (<15 MICROMETRES)		17.0	37.3	0.3	2.3	8.0	< 64.3		674.7	
VANCOUVER 23NOV80 NAPS NO. 55.0	1413	COARSE	464	1.7	19.0	0.4	1.8	< 3.7	< 29.7	5.9	226.5	
		FINE	465	15.2	34.5	0.8	2.4	< 4.6	< 37.2	15.8	817.3	
		TOTAL (<15 MICROMETRES)		17.0	53.6	1.2	4.2	< 8.4	< 66.8	21.7	1043.8	
VANCOUVER 29NOV80 NAPS NO. 56.0	1407	COARSE	466	1.7	11.0	0.2	0.3	< 4.3	< 34.3	14.6	68.5	
		FINE	467	14.9	12.7	0.0	0.0	0.0	0.0	0.0	0.0	FA
		TOTAL (<15 MICROMETRES)		16.6	23.7							

COMMENT CODES
****

A - MISSING	D - VOID
C - COARSE	F - FINE

DICHOTOMOUS AIRBORNE PARTICULATE STUDY

SAMPLE ID	DURATION (MIN.)	FRACTION	FILTER NO.	FLOW (L/M)	MASS (UG/M3)	NITRATE (UG/M3)	SULFATE (UG/M3)	ARSENIC (NG/M3)	CADMIUM (NG/M3)	CHROMIUM (NG/M3)	LEAD (NG/M3)	COMMENTS
VANCOUVER 5DEC80 NAPS NO. 57.0	1433	COARSE	468	1.7	11.3	0.0	0.5	< 3.7	< 29.6	9.0	82.6	
		FINE	469	15.0	25.5	0.0	2.9	< 4.6	< 37.2	10.2	334.7	
TOTAL (<15 MICROMETRES)				16.7	36.9		3.4	< 8.3	< 66.8	19.2	417.4	
VANCOUVER 11DEC80 NAPS NO. 58.0	1439	COARSE	470	1.7	14.6	0.0	0.6	< 5.4	< 29.2	12.7	139.6	
		FINE	471	15.3	17.0	0.0	2.6	13.6	< 36.4	4.5	499.9	
TOTAL (<15 MICROMETRES)				17.0	31.6		3.1	> 13.6	< 65.6	17.2	639.6	
VANCOUVER 17DEC80 NAPS NO. 59.0	1440	COARSE	472	1.7	4.7	0.0	1.6	< 3.7	< 29.2	11.0	74.1	
		FINE	473	15.3	16.1	0.0	2.1	< 4.5	< 36.3	12.7	163.5	
TOTAL (<15 MICROMETRES)				17.0	20.9		3.7	< 8.2	< 65.6	23.8	237.6	
VANCOUVER 23DEC80 NAPS NO. 60.0	1440	COARSE	632	1.7	18.9	0.0	0.8	< 4.1	< 32.8	8.2	213.0	
		FINE	633	15.3	17.7	0.0	0.0	0.0	0.0	0.0	0.0	FA
TOTAL (<15 MICROMETRES)				17.0	36.6							
VANCOUVER 29DEC80 NAPS NO. 61.0	1447	COARSE	634	1.7	10.1	0.0	0.4	< 3.3	< 26.6	4.5	143.3	
		FINE	635	17.0	22.7	0.0	1.5	< 4.1	< 32.6	7.3	538.2	
TOTAL (<15 MICROMETRES)				18.7	32.8		1.9	< 7.4	< 59.3	11.9	681.5	

COMMENT CODES
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A - MISSING	D - VOID
C - COARSE	F - FINE

Concord Scientific Corporation

DICHOTOMOUS AIRBORNE PARTICULATE STUDY

SAMPLE ID	DURATION (MIN.)	FRACTION	FILTER NO.	FLOW (L/M)	MASS (UG/M3)	NITRATE (UG/M3)	SULFATE (UG/M3)	ARSENIC (NG/M3)	CADMIUM (NG/M3)	CHROMIUM (NG/M3)	LEAD (NG/M3)	COMMENTS
WINNIPEG												
18SEPT80												
NAPS NO. 44.0	1419	COARSE	228	1.7	27.1	0.2	1.1	4.7	< 30.2	3.1	117.6	
		FINE	229	14.9	17.9	0.1	1.6	< 4.7	< 37.8	2.8	519.2	
TOTAL (<15 MICROMETRES)				16.6	45.0	0.3	2.7	> 4.7	< 67.9	5.9	636.8	
WINNIPEG												
24SEPT80												
NAPS NO. 45.0	1451	COARSE	230	1.7	34.5	0.0	0.1	7.3	< 29.3	3.0	104.5	
		FINE	231	15.0	10.4	0.0	0.5	9.2	< 36.7	2.8	275.1	
TOTAL (<15 MICROMETRES)				16.7	44.8	.	0.6	16.5	< 66.0	5.8	379.7	
WINNIPEG												
30SEPT80												
NAPS NO. 46.0	1435	COARSE	232	1.7	57.3	0.1	0.5	3.7	< 29.7	3.8	100.1	
		FINE	233	15.0	9.8	0.1	2.0	4.6	< 37.1	3.7	250.4	
TOTAL (<15 MICROMETRES)				16.7	67.1	0.3	2.6	8.3	< 66.8	7.5	350.5	
WINNIPEG												
OCT6/80												
NAPS NO. 47.0	1470	COARSE	234	1.7	43.2	0.2	1.1	144.9	< 29.0	< 1.8	397.1	
		FINE	279	15.0	20.8	0.1	3.2	18.1	< 36.2	18.1	678.9	
TOTAL (<15 MICROMETRES)				16.7	64.0	0.3	4.3	163.0	< 65.2	> 18.1	1076.0	
WINNIPEG												
OCT12/80												
NAPS NO. 48.0	1410	COARSE	280	1.7	19.5	0.0	0.0	< 0.5	3.8	0.0	< 18.9	
		FINE	281	15.0	8.5	0.0	< 0.1	4.7	< 37.7	0.0	188.7	A
TOTAL (<15 MICROMETRES)				16.7	28.0			> 4.7	> 3.8		> 188.7	
WINNIPEG												
OCT18												
NAPS NO. 49.0	1444	COARSE	282	1.7	23.1	0.1	< 0.4	3.7	< 29.3	0.0	98.2	
		FINE	283	15.1	11.7	0.0	1.3	4.6	< 36.6	0.0	256.3	A
TOTAL (<15 MICROMETRES)				16.8	34.8		> 1.3	8.2	< 66.0		354.5	

COMMENT CODES
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A - MISSING	D - VOID
C - COARSE	F - FINE

Concord Scientific Corporation

DICHOTOMOUS AIRBORNE PARTICULATE STUDY

SAMPLE ID	DURATION (MIN.)	FRACTION	FILTER NO.	FLOW (L/M)	MASS (UG/M3)	NITRATE (UG/M3)	SULFATE (UG/M3)	ARSENIC (NG/M3)	CADMIUM (NG/M3)	CHROMIUM (NG/M3)	LEAD (NG/M3)	COMMENTS
WINNIPEG OCT24 NAPS NO. 50.0	1443	COARSE	284	1.7	24.3	0.0	< 0.5	4.6	< 29.4	6.6	105.5	
		FINE	285	15.1	14.4	0.0	< 0.4	< 4.6	< 36.6	0.0	183.2	FA
TOTAL (<15 MICROMETRES)				16.8	38.7		< 0.8	> 4.6	< 66.0		288.8	
WINNIPEG OCT30/80 NAPS NO. 51.0	1442	COARSE	288	1.7	77.2	0.1	< 0.5	3.7	< 29.4	1.3	97.4	
		FINE	289	15.1	19.7	0.1	< 1.8	4.6	< 36.7	36.7	183.3	
TOTAL (<15 MICROMETRES)				16.8	96.9	0.2	< 2.3	8.3	< 66.0	38.0	280.7	
WINNIPEG 5-NOV-80 NAPS NO. 52.0	1439	COARSE	290	1.7	46.8	0.3	0.5	3.7	< 29.6	33.7	172.5	
		FINE	291	15.1	15.7	0.1	0.8	4.6	< 36.9	< 3.7	360.2	
TOTAL (<15 MICROMETRES)				16.7	62.5	0.5	1.2	8.3	< 66.6	> 33.7	532.6	
WINNIPEG 11NOV80 NAPS NO. 53.0	1444	COARSE	292	1.7	20.8	0.4	1.1	3.7	< 29.5	< 7.0	90.5	
		FINE	293	15.1	19.1	3.1	2.1	4.6	< 36.8	36.8	174.9	
TOTAL (<15 MICROMETRES)				16.7	39.9	3.5	3.1	8.3	< 66.3	> 36.8	265.4	
WINNIPEG 17NOV80 NAPS NO. 54.0	1444	COARSE	438	1.7	43.4	0.1	1.5	< 3.7	< 29.5	3.8	209.6	
		FINE	439	15.1	9.5	3.0	0.9	< 4.6	< 36.8	3.7	312.9	
TOTAL (<15 MICROMETRES)				16.7	52.9	3.1	2.4	< 8.3	< 66.3	7.5	522.5	
WINNIPEG 23NOV80 NAPS NO. 55.0	1444	COARSE	442	1.7	18.4	0.0	0.7	< 4.1	< 33.2	13.3	107.8	
		FINE	443	15.1	6.2	0.0	0.0	0.0	0.0	0.0	0.0	FA
TOTAL (<15 MICROMETRES)				16.7	24.5							

COMMENT CODES
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A - MISSING	B - VOID
C - COARSE	F - FINE

DICHOTOMOUS AIRBORNE PARTICULATE STUDY

SAMPLE ID	DURATION (MIN.)	FRACTION	FILTER NO.	FLOW (L/M)	MASS (UG/M3)	NITRATE (UG/M3)	SULFATE (UG/M3)	ARSENIC (NG/M3)	CADMIUM (NG/M3)	CHROMIUM (NG/M3)	LEAD (NG/M3)	COMMENTS
WINNIPEG 29NOV80 NAPS NO. 56.0	1442	COARSE	444	1.7	29.6	0.0	0.5	< 3.7	< 29.6	7.4	142.3	
		FINE	445	15.1	12.2	0.2	1.6	< 4.6	< 36.9	9.2	156.7	
TOTAL (<15 MICROMETRES)				16.7	41.8		2.1	< 8.3	< 66.4	16.6	299.0	
WINNIPEG 5DEC80 NAPS NO. 57.0	1473	COARSE	448	1.7	21.7	0.0	1.1	< 3.8	< 28.9	8.3	92.1	
		FINE	449	15.0	4.5	0.0	0.0	< 2.3	< 36.1	< 1.8	135.5	FA
TOTAL (<15 MICROMETRES)				16.7	26.3			< 6.1	< 65.0	> 8.3	227.7	
WINNIPEG 11DEC80 NAPS NO. 58.0	1445	COARSE	606	1.7	40.8	0.0	0.7	< 3.7	< 29.5	16.3	118.8	
		FINE	607	15.0	19.6	0.0	1.5	< 4.6	< 36.8	2.8	303.9	
TOTAL (<15 MICROMETRES)				16.7	60.5		2.2	< 8.3	< 66.3	19.1	422.7	
WINNIPEG 17DEC80 NAPS NO. 59.0	1443	COARSE	608	1.7	18.9	0.0	1.2	< 3.7	< 29.5	3.2	134.6	
		FINE	609	15.0	15.2	0.0	5.0	< 4.6	< 36.9	9.2	147.5	
TOTAL (<15 MICROMETRES)				16.7	34.1		6.2	< 8.3	< 66.4	12.4	282.2	
WINNIPEG 23DEC80 NAPS NO. 60.0	1445	COARSE	612	1.7	11.6	0.0	0.5	4.1	< 32.9	< 1.6	164.3	
		FINE	613	15.2	13.8	0.0	0.0	0.0	0.0	0.0	0.0	FA
TOTAL (<15 MICROMETRES)				16.9	25.4							
WINNIPEG 29DEC80 NAPS NO. 61.0	1445	COARSE	614	1.7	24.3	0.0	1.8	< 4.6	< 36.8	< 2.0	117.9	
		FINE	615	15.0	22.3	0.0	< 0.6	4.6	36.8	3.7	313.1	
TOTAL (<15 MICROMETRES)				16.7	46.6	.	> 1.8	> 4.6	> 36.8	> 3.7	431.0	

COMMENT CODES
****

A - MISSING
C - COARSE

D - VOID
F - FINE

DICHOTOMOUS AIRBORNE PARTICULATE STUDY

SAMPLE ID	DURATION (MIN.)	FRACTION	FILTER NO.	FLOW (L/M)	MASS (UG/M3)	NITRATE (UG/M3)	SULFATE (UG/M3)	ARSENIC (NG/M3)	CADMIUM (NG/M3)	CHROMIUM (NG/M3)	LEAD (NG/M3)	COMMENTS
WINNIPEG JAN4/81 NAPS NO. 1.0	1446	COARSE	616	1.7	28.9	0.0	0.5	< 3.7	< 29.4	2.7	112.3	
		FINE	617	15.0	27.6	0.0	5.2	< 4.6	< 36.8	< 1.8	202.5	
TOTAL (<15 MICROMETRES)				16.7	56.4		5.7	< 8.3	< 66.3	> 2.7	314.7	
WINNIPEG JAN10/81 NAPS NO. 2.0	1443	COARSE	696	1.7	25.0	0.0	1.5	< 4.6	< 29.5	< 0.6	247.1	
		FINE	697	15.0	34.3	0.0	6.1	4.6	< 36.9	< 1.8	599.4	
TOTAL (<15 MICROMETRES)				16.7	59.3		7.6	> 4.6	< 66.4	< 2.5	846.5	
WINNIPEG JAN16/81 NAPS NO. 3.0	1444	COARSE	698	1.6	11.9	0.0	1.0	< 3.7	< 30.0	8.6	208.8	
		FINE	699	14.8	15.3	0.0	2.7	< 4.7	< 37.4	< 1.9	355.6	
TOTAL (<15 MICROMETRES)				16.4	27.3		3.7	< 8.4	< 67.4	> 8.6	564.5	
WINNIPEG JAN22/81 NAPS NO. 4.0	1444	COARSE	700	1.7	37.1	0.0	1.0	< 4.7	< 30.0	3.6	325.1	
		FINE	701	14.7	41.7	0.0	1.3	4.7	< 37.6	5.6	705.2	
TOTAL (<15 MICROMETRES)				16.4	78.8		2.3	> 4.7	< 67.6	9.3	1030.3	
WINNIPEG JAN28/81 NAPS NO. 5.0	1443	COARSE	702	1.7	14.0	0.0	0.3	4.6	< 29.5	8.5	127.3	
		FINE	703	15.0	24.2	0.0	2.1	< 4.6	< 36.9	< 1.8	304.3	
TOTAL (<15 MICROMETRES)				16.7	38.2		2.4	> 4.6	< 66.4	> 8.5	431.6	

COMMENT CODES
****

A - MISSING
C - COARSE

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F - FINE

DICHOTOMOUS AIRBORNE PARTICULATE STUDY

SAMPLE ID	DURATION (MIN.)	FRACTION	FILTER NO.	FLOW (L/M)	MASS (UG/M3)	NITRATE (UG/M3)	SULFATE (UG/M3)	ARSENIC (NG/M3)	CADMIUM (NG/M3)	CHROMIUM (NG/M3)	LEAD (NG/M3)	COMMENTS
EDMONTON 18-SEPT-80												
NAPS NO. 44.0	1288	COARSE	235	1.7	16.4	0.1	< 0.2	4.9	< 31.6	14.5	70.2	
		FINE	236	15.9	15.5	0.0	0.0	< 4.9	< 39.0	4.9	282.7	FA
TOTAL (<15 MICROMETRES)				17.6	31.9	0.1	0.0	> 4.9	< 70.6	19.4	352.9	
EDMONTON 24-SEPT-80												
NAPS NO. 45.0	931	COARSE	237	1.7	67.1	0.1	1.6	< 5.3	< 42.1	9.8	161.4	
		FINE	238	16.7	20.2	0.2	0.6	< 6.4	< 51.5	7.7	669.3	
TOTAL (<15 MICROMETRES)				18.4	87.3	0.3	2.1	< 11.7	< 93.6	17.6	830.7	
EDMONTON 30-SEPT-80												
NAPS NO. 46.0	1453	COARSE	239	1.7	54.0	0.1	0.3	7.9	< 27.0	6.0	165.7	
		FINE	240	16.7	11.5	0.0	0.5	< 4.1	< 33.0	8.2	486.6	
TOTAL (<15 MICROMETRES)				18.4	65.6	0.1	0.8	> 7.9	< 60.0	14.2	652.2	
EDMONTON 6-OCT-80												
NAPS NO. 47.0	1411	COARSE	265	1.6	131.5	0.3	< 0.6	3.5	< 28.1	29.6	226.0	
		FINE	264	16.6	23.1	0.2	1.2	4.3	< 34.2	17.1	607.4	
TOTAL (<15 MICROMETRES)				18.2	154.7	0.5	> 1.2	7.8	< 62.3	46.7	833.3	
EDMONTON 12-OCT-80												
NAPS NO. 48.0	1413	COARSE	266	1.6	30.6	0.3	0.4	3.6	< 28.6	28.6	69.0	
		FINE	267	16.2	17.9	0.1	1.8	4.4	< 35.0	35.0	201.1	
TOTAL (<15 MICROMETRES)				17.8	48.5	0.4	2.2	7.9	< 63.5	63.5	270.1	
EDMONTON 18-OCT-80												
NAPS NO. 49.0	1413	COARSE	268	1.7	76.1	0.2	< 0.5	4.3	< 27.9	27.9	136.6	
		FINE	269	16.5	20.1	0.2	0.5	< 4.3	< 34.3	34.3	711.1	
TOTAL (<15 MICROMETRES)				18.2	96.3	0.4	> 0.5	> 4.3	< 62.2	62.2	847.7	

COMMENT CODES
****

A - MISSING
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F - FINE

Concord Scientific Corporation

DICHOTOMOUS AIRBORNE PARTICULATE STUDY

SAMPLE ID	DURATION (MIN.)	FRACTION	FILTER NO.	FLOW (L/M)	MASS (UG/M3)	NITRATE (UG/M3)	SULFATE (UG/M3)	ARSENIC (NG/M3)	CADMIUM (NG/M3)	CHROMIUM (NG/M3)	LEAD (NG/M3)	COMMENTS
EDMONTON 24-OCT-80 NAPS NO. 50.0	1407	COARSE	270	1.7	90.5	< 0.1	0.7	3.5	< 28.3	< 4.0	289.8	
		FINE	271	16.4	37.5	2.8	3.8	4.3	< 34.7	8.7	955.2	
TOTAL (<15 MICROMETRES)				18.0	128.0	> 2.8	4.4	7.9	< 63.0	> 8.7	1245.0	
EDMONTON 30-OCT-80 NAPS NO. 51.0	1409	COARSE	272	1.7	86.9	0.2	< 0.4	3.5	< 28.3	14.1	228.8	
		FINE	273	16.4	20.3	0.2	< 0.5	4.3	< 34.7	17.3	502.9	
TOTAL (<15 MICROMETRES)				18.0	107.2	0.4	< 0.9	7.9	< 62.9	31.5	731.8	
EDMONTON 5-NOV-80 NAPS NO. 52.0	1413	COARSE	450	1.7	100.5	0.3	< 0.6	3.5	< 28.2	6.6	352.3	
		FINE	451	16.4	42.9	1.2	1.6	4.3	< 34.5	5.2	1295.4	
TOTAL (<15 MICROMETRES)				18.0	143.4	1.5	> 1.6	7.8	< 62.8	11.8	1647.7	
EDMONTON 11-NOV-80 NAPS NO. 53.0	1409	COARSE	452	1.7	16.6	0.3	0.7	4.3	< 28.3	5.7	136.3	
		FINE	453	16.4	22.1	4.3	7.9	< 4.3	< 34.7	< 1.7	312.2	
TOTAL (<15 MICROMETRES)				18.0	38.8	4.6	8.7	> 4.3	< 62.9	> 5.7	448.5	
EDMONTON 17-NOV-80 NAPS NO. 54.0	1380	COARSE	454	1.7	75.3	0.3	0.7	< 4.0	< 32.1	15.3	305.3	
		FINE	455	16.4	19.5	0.0	0.0	0.0	0.0	0.0	0.0	FA
TOTAL (<15 MICROMETRES)				18.0	94.8							
EDMONTON 23-NOV-80 NAPS NO. 55.0	1404	COARSE	456	1.7	18.4	< 0.1	< 0.4	3.5	< 28.4	25.3	132.6	
		FINE	457	16.4	11.9	0.6	< 0.7	4.4	< 34.8	< 17.4	274.1	
TOTAL (<15 MICROMETRES)				18.0	30.3	> 0.6	< 1.1	7.9	< 63.2	> 25.3	406.7	

COMMENT CODES
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A - MISSING
C - COARSE
D - VOID
F - FINE

DICHOTOMOUS AIRBORNE PARTICULATE STUDY

SAMPLE ID	DURATION (MIN.)	FRACTION	FILTER NO.	FLOW (L/M)	MASS (UG/M3)	NITRATE (UG/M3)	SULFATE (UG/M3)	ARSENIC (NG/M3)	CADMIUM (NG/M3)	CHROMIUM (NG/M3)	LEAD (NG/M3)	COMMENTS
TORONTO(ROOF) 2NOV80 NAPS NO. 51.5	1437	COARSE	402	1.7	4.9	0.0	< 0.4	0.5	3.7	< 0.5	< 28.0	
		FINE	403	15.0	7.9	0.1	3.0	< 4.6	< 37.1	4.6	278.0	
TOTAL (<15 MICROMETRES)				16.7	12.8		> 3.0	> 0.5	> 3.7	> 4.6	> 278.0	
TORONTO(ROOF) 5-NOV-80 NAPS NO. 52.0	1437	COARSE	404	1.7	7.3	0.0	< 0.1	< 4.6	< 29.6	1.9	95.4	
		FINE	405	15.0	5.8	0.1	0.6	4.6	< 37.0	6.5	213.0	
TOTAL (<15 MICROMETRES)				16.7	13.1		> 0.6	> 4.6	< 66.7	8.3	308.4	
TORONTO(ROOF) 8-NOV-80 NAPS NO. 52.5	1437	COARSE	518	1.7	14.2	0.0	1.5	< 3.7	< 12.9	6.7	87.8	
		FINE	519	15.0	15.4	0.0	0.0	< 4.6	< 37.1	8.3	203.9	FA
TOTAL (<15 MICROMETRES)				16.7	29.6			< 8.3	< 50.0	15.0	291.7	
TORONTO(ROOF) 11NOV80 NAPS NO. 53.0	1437	COARSE	520	1.7	20.3	1.0	< 0.3	< 3.7	< 29.6	7.3	83.3	
		FINE	521	15.0	12.3	0.0	0.0	< 4.6	< 37.0	10.2	166.7	FA
TOTAL (<15 MICROMETRES)				16.7	32.6			< 8.3	< 66.7	17.5	250.0	
TORONTO(ROOF) 14NOV80 NAPS NO. 53.5	1437	COARSE	522	1.7	15.0	< 0.2	0.4	< 3.7	< 29.6	8.7	98.2	
		FINE	523	15.0	17.9	1.6	3.0	< 4.6	< 37.0	4.6	268.5	
TOTAL (<15 MICROMETRES)				16.7	32.9	> 1.6	3.3	< 8.3	< 66.7	13.3	366.7	
TORONTO(ROOF) 17NOV80 NAPS NO. 54.0	1437	COARSE	524	1.7	19.4	< 2.2	< 0.3	< 4.2	< 33.3	< 1.7	133.3	
		FINE	525	15.0	19.0	23.7	7.5	0.0	0.0	0.0	0.0	FA
TOTAL (<15 MICROMETRES)				16.7	38.4	> 23.7	> 7.5					

COMMENT CODES
****

A - MISSING	D - VOID
C - COARSE	F - FINE

DICHOTOMOUS AIRBORNE PARTICULATE STUDY

SAMPLE ID	DURATION (MIN.)	FRACTION	FILTER NO.	FLOW (L/M)	MASS (UG/M3)	NITRATE (UG/M3)	SULFATE (UG/M3)	ARSENIC (NG/M3)	CADMIUM (NG/M3)	CHROMIUM (NG/M3)	LEAD (NG/M3)	COMMENTS
TORONTO(ROOF)												
20NOV80												
NAPS NO. 54.5	1436	COARSE	526	1.7	22.7	2.7	0.6	< 4.6	< 29.7	13.3	30.6	
		FINE	527	15.0	47.6	0.0	7.8	4.6	< 37.1	9.3	361.4	
		TOTAL (<15 MICROMETRES)		16.7	70.3	-	8.4	> 4.6	< 66.7	22.5	392.0	
TORONTO(ROOF)												
23-NOV-80												
NAPS NO. 55.0	1436	COARSE	528	1.7	24.2	39.8	0.7	< 4.6	< 29.7	21.6	36.1	
		FINE	529	15.0	28.0	2.7	5.5	4.6	< 37.1	9.3	222.4	
		TOTAL (<15 MICROMETRES)		16.7	52.2	42.4	6.2	> 4.6	< 66.7	30.9	258.5	
TORONTO(ROOF)												
NOVEMBER26/80												
NAPS NO. 55.5	1436	COARSE	530	1.7	25.2	0.3	0.0	< 3.7	< 29.7	10.6	41.7	
		FINE	531	15.0	26.5	4.4	3.5	< 4.6	< 37.1	11.1	500.4	CA
		TOTAL (<15 MICROMETRES)		16.7	51.7	4.7		< 8.3	< 66.7	21.7	542.1	
TORONTO(ROOF)												
29NOV80												
NAPS NO. 56.0	1435	COARSE	532	1.7	8.9	0.0	0.6	< 3.7	< 29.7	6.6	64.0	
		FINE	533	15.0	15.5	1.4	3.0	< 4.6	< 37.1	9.3	194.7	
		TOTAL (<15 MICROMETRES)		16.7	24.5		3.6	< 8.3	< 66.8	15.9	258.7	
TORONTO(ROOF)												
2DEC80												
NAPS NO. 56.5	1435	COARSE	574	1.7	36.3	0.0	1.2	< 4.6	< 29.7	10.3	44.5	
		FINE	575	15.0	23.5	0.0	3.6	4.6	< 37.1	13.9	222.6	
		TOTAL (<15 MICROMETRES)		16.7	59.8		4.8	> 4.6	< 66.8	24.2	267.1	
TORONTO(ROOF)												
5DEC80												
NAPS NO. 57.0	1435	COARSE	576	1.7	40.4	0.0	0.4	< 3.7	< 29.7	3.0	25.0	
		FINE	577	15.0	22.3	0.0	2.1	< 4.6	< 37.1	12.1	500.7	
		TOTAL (<15 MICROMETRES)		16.7	62.6		2.5	< 8.3	< 66.8	15.0	525.8	

COMMENT CODES
****

A - MISSING
C - COARSE
D - VOID
F - FINE

DICHOTOMOUS AIRBORNE
PARTICULATE STUDY

SAMPLE ID	DURATION (MIN.)	FRACTION	FILTER NO.	FLOW (L/M)	MASS (UG/M3)	NITRATE (UG/M3)	SULFATE (UG/M3)	ARSENIC (NG/M3)	CADMIUM (NG/M3)	CHROMIUM (NG/M3)	LEAD (NG/M3)	COMMENTS
TORONTO(ROOF) 11DEC80 NAPS NO. 58.0	1435	COARSE	578	1.7	33.7	0.0	0.0	< 3.7	< 29.7	9.0	< 13.6	
		FINE	579	15.0	19.0	0.0	2.7	< 4.6	< 37.1	10.2	194.7	CA
		TOTAL (<15 MICROMETRES)		16.7	52.6			< 8.3	< 66.8	19.2	> 194.7	
TORONTO(ROOF) 17DEC80 NAPS NO. 59.0	1435	COARSE	580	1.7	33.2	0.0	0.3	< 3.7	< 29.7	12.5	47.3	
		FINE	581	15.0	26.5	0.0	5.1	< 4.6	< 37.1	16.7	361.6	
		TOTAL (<15 MICROMETRES)		16.7	59.8		5.4	< 8.3	< 66.8	29.2	408.9	
TORONTO(ROOF) 23DEC80 NAPS NO. 60.0	1433	COARSE	582	1.7	34.5	0.0	1.8	< 4.2	< 33.4	13.4	83.6	
		FINE	583	15.0	47.3	0.0	0.0	0.0	0.0	0.0	0.0	FA
		TOTAL (<15 MICROMETRES)		16.7	81.8							
TORONTO(ROOF) JAN4/81 NAPS NO. 1.0	1435	COARSE	586	1.7	18.0	0.0	0.3	< 3.7	< 29.7	2.9	84.4	
		FINE	587	15.0	28.1	0.0	3.8	< 4.6	< 37.1	4.6	241.1	
		TOTAL (<15 MICROMETRES)		16.7	46.1		4.1	< 8.3	< 66.8	7.5	325.5	
TORONTO(ROOF) 10-JAN-81 NAPS NO. 2.0	1435	COARSE	733	1.7	21.6	0.0	0.4	< 4.6	< 29.7	2.2	96.4	
		FINE	734	15.0	33.2	0.0	4.5	4.6	< 37.1	2.8	287.5	
		TOTAL (<15 MICROMETRES)		16.7	54.8		4.9	> 4.6	< 66.8	5.0	383.9	
TORONTO(ROOF) JAN16/81 NAPS NO. 3.0	1433	COARSE	735	1.7	17.3	0.0	0.1	< 4.6	< 29.7	4.4	65.0	
		FINE	736	15.0	46.8	0.0	8.4	4.6	< 37.1	< 1.9	352.9	
		TOTAL (<15 MICROMETRES)		16.7	64.1		8.6	> 4.6	< 66.9	> 4.4	417.9	

COMMENT CODES
****

A - MISSING
C - COARSE
D - VOID
F - FINE

Concord Scientific Corporation

DICHOTOMOUS AIRBORNE PARTICULATE STUDY

SAMPLE ID	DURATION (MIN.)	FRACTION	FILTER NO.	FLOW (L/M)	MASS (UG/M3)	NITRATE (UG/M3)	SULFATE (UG/M3)	ARSENIC (NG/M3)	CADMIUM (NG/M3)	CHROMIUM (NG/M3)	LEAD (NG/M3)	COMMENTS
TORONTO(ROOF) JAN22/81 NAPS NO. 4.0	1434	COARSE	737	1.7	18.6	0.0	1.0	< 3.7	< 29.7	3.5	91.9	
		FINE	738	15.0	43.6	0.0	7.2	< 4.6	< 37.1	< 1.9	334.1	
TOTAL (<15 MICROMETRES)				16.7	62.2		8.3	< 8.4	< 66.8	> 3.5	425.9	
TORONTO(ROOF) JAN28/81 NAPS NO. 5.0	1433	COARSE	739	1.7	44.6	0.0	0.5	< 3.7	< 29.7	< 1.5	113.3	
		FINE	740	15.0	13.4	0.0	2.6	< 4.6	< 37.1	< 1.9	287.9	
TOTAL (<15 MICROMETRES)				16.7	58.0		3.0	< 8.4	< 66.9	< 3.3	401.2	

COMMENT CODES
****

A - MISSING	D - VOID
C - COARSE	F - FINE

DICHOTOMOUS AIRBORNE
PARTICULATE STUDY

SAMPLE ID	DURATION (MIN.)	FRACTION	FILTER NO.	FLOW (L/M)	MASS (UG/M3)	NITRATE (UG/M3)	SULFATE (UG/M3)	ARSENIC (NG/M3)	CADMIUM (NG/M3)	CHROMIUM (NG/M3)	LEAD (NG/M3)	COMMENTS
TORONTO(CURB) 9OCT80 NAPS NO. 47.5	1405	COARSE	339	1.7	23.8	0.2	< 1.2	3.8	< 30.3	18.0	197.9	
		FINE	340	15.0	13.7	0.0	1.7	4.7	< 37.9	7.6	492.5	
		TOTAL (<15 MICROMETRES)		16.7	37.5		> 1.7	8.5	< 68.2	25.6	690.4	
TORONTO(CURB) 12OCT80 NAPS NO. 48.0	1474	COARSE	341	1.7	18.9	0.0	< 1.2	< 4.6	< 29.1	3.5	98.1	
		FINE	342	14.9	7.1	0.1	2.2	4.6	< 36.5	6.4	246.2	
		TOTAL (<15 MICROMETRES)		16.6	26.0		> 2.2	> 4.6	< 65.6	9.8	344.3	
TORONTO(CURB) 15OCT80 NAPS NO. 48.5	1427	COARSE	343	1.7	23.6	0.9	0.0	4.7	< 29.8	9.3	155.4	
		FINE	344	15.0	20.8	0.1	< 1.1	< 4.7	< 37.3	7.5	541.2	CA
		TOTAL (<15 MICROMETRES)		16.7	44.4	1.0		> 4.7	< 67.1	16.8	696.6	
TORONTO(CURB) 18OCT80 NAPS NO. 49.0	1434	COARSE	345	1.7	20.5	0.2	< 1.3	< 4.6	< 29.7	5.8	150.6	
		FINE	346	15.0	20.2	0.0	2.7	4.6	< 37.1	9.3	417.3	
		TOTAL (<15 MICROMETRES)		16.7	40.7		> 2.7	> 4.6	< 66.8	15.0	567.9	
TORONTO(CURB) 21OCT80 NAPS NO. 49.5	1410	COARSE	347	1.7	20.0	0.2	< 0.4	3.8	< 30.2	5.0	260.5	
		FINE	348	15.0	19.2	0.3	3.2	4.7	< 37.7	9.4	707.8	
		TOTAL (<15 MICROMETRES)		16.7	39.2	0.5	> 3.2	8.5	< 67.9	14.4	968.3	
TORONTO(CURB) 24OCT80 NAPS NO. 50.0	1447	COARSE	349	1.7	38.6	0.5	< 0.2	4.6	< 29.4	9.1	368.8	
		FINE	350	15.0	16.5	0.3	< 0.1	< 4.6	< 36.8	8.3	781.7	
		TOTAL (<15 MICROMETRES)		16.7	55.1	0.8	< 0.2	> 4.6	< 66.2	17.4	1150.4	

COMMENT CODES
****

A - MISSING
C - COARSE

D - VOID
F - FINE

DICHOTOMOUS AIRBORNE PARTICULATE STUDY

SAMPLE ID	DURATION (MIN.)	FRACTION	FILTER NO.	FLOW (L/M)	MASS (UG/M3)	NITRATE (UG/M3)	SULFATE (UG/M3)	ARSENIC (NG/M3)	CADMIUM (NG/M3)	CHROMIUM (NG/M3)	LEAD (NG/M3)	COMMENTS
TORONTO(CURB) 27OCT80												
NAPS NO. 50.5	1411	COARSE	351	1.7	27.7	0.3	< 0.6	3.8	< 30.2	< 3.4	202.4	
		FINE	352	15.0	19.6	1.0	3.3	4.7	< 37.7	0.0	519.0	FA
TOTAL (<15 MICROMETRES)				16.7	47.3	1.2	> 3.3	8.5	< 67.9	>.	721.4	
TORONTO(CURB) 30OCT80												
NAPS NO. 51.0	1412	COARSE	353	1.7	29.1	0.5	0.4	3.8	< 30.2	< 3.4	213.6	
		FINE	354	15.1	21.4	1.3	3.1	4.7	< 37.6	0.0	498.8	FA
TOTAL (<15 MICROMETRES)				16.7	50.5	1.8	3.5	8.5	< 67.9		712.5	
TORONTO(CURB) 2NOV80												
NAPS NO. 51.5	1433	COARSE	406	1.7	14.1	0.5	1.5	< 4.6	< 29.7	< 1.5	117.9	
		FINE	407	15.0	11.7	0.1	3.7	4.6	< 37.1	< 1.9	408.6	
TOTAL (<15 MICROMETRES)				16.7	25.8	0.6	5.2	> 4.6	< 66.9	< 3.3	526.5	
TORONTO(CURB) 5NOV80												
NAPS NO. 52.0	1411	COARSE	408	1.7	-25.8	0.3	1.2	4.7	< 30.2	3.2	181.1	
		FINE	409	15.0	5.0	0.0	< 0.8	< 4.7	< 37.7	1.9	481.0	D
TOTAL (<15 MICROMETRES)				16.7	-20.9		> 1.2	> 4.7	< 67.9	5.1	662.0	
TORONTO(CURB) 8NOV80												
NAPS NO. 52.5	1431	COARSE	410	1.7	20.6	0.4	1.3	< 4.6	< 29.8	6.9	274.3	
		FINE	411	15.0	8.1	0.1	1.4	4.6	< 37.2	< 18.6	604.4	
TOTAL (<15 MICROMETRES)				16.7	28.7	0.5	2.7	> 4.6	< 67.0	> 6.9	878.7	
TORONTO(CURB) 11NOV80												
NAPS NO. 53.0	1438	COARSE	412	1.7	18.7	0.0	< 0.5	< 3.7	< 29.6	2.9	78.7	
		FINE	413	15.0	6.5	0.0	1.4	< 4.6	< 37.0	4.6	212.8	
TOTAL (<15 MICROMETRES)				16.7	25.2		> 1.4	< 8.3	< 66.6	7.5	291.5	

COMMENT CODES
****

A - MISSING
C - COARSE
D - VOID
F - FINE

DICHOTOMOUS AIRBORNE
PARTICULATE STUDY

SAMPLE ID	DURATION (MIN.)	FRACTION	FILTER NO.	FLOW (L/M)	MASS (UG/M3)	NITRATE (UG/M3)	SULFATE (UG/M3)	ARSENIC (NG/M3)	CADMIUM (NG/M3)	CHROMIUM (NG/M3)	LEAD (NG/M3)	COMMENTS
TORONTO(CURB) 14NOV80 NAPS NO. 53.5	1458	COARSE	534	1.7	20.0	< 6.0	0.5	< 3.7	< 29.3	5.2	44.4	
		FINE	535	15.1	21.1	66.7	2.8	< 4.6	< 36.5	13.7	464.8	
		TOTAL (<15 MICROMETRES)		16.7	41.2	> 66.7	3.3	< 8.2	< 65.7	18.9	509.3	
TORONTO(CURB) 17NOV80 NAPS NO. 54.0	1411	COARSE	536	1.7	23.8	24.8	0.9	< 3.8	< 30.2	10.6	63.2	
		FINE	537	15.0	25.9	1.1	3.2	< 4.7	< 37.7	13.2	556.4	
		TOTAL (<15 MICROMETRES)		16.7	49.7	26.0	4.2	< 8.5	< 67.9	23.8	619.6	
TORONTO(CURB) 20NOV80 NAPS NO. 54.5	892	COARSE	538	1.7	66.8	13.6	1.6	< 6.0	< 47.7	18.6	97.0	
		FINE	539	15.0	64.1	0.7	8.4	< 7.5	< 59.7	14.9	910.0	
		TOTAL (<15 MICROMETRES)		16.7	130.9	14.3	10.0	< 13.4	<107.4	33.6	1007.0	
TORONTO(CURB) 23NOV80 NAPS NO. 55.0	1445	COARSE	540	1.7	38.9	< 0.2	1.9	< 4.6	< 29.5	9.7	97.6	
		FINE	541	15.0	28.1	16.9	6.4	4.6	< 36.8	11.1	432.8	
		TOTAL (<15 MICROMETRES)		16.7	67.0	> 16.9	8.4	> 4.6	< 66.3	20.7	530.4	
TORONTO(CURB) 26NOV80 NAPS NO. 55.5	1415	COARSE	542	1.7	36.0	3.3	0.0	< 3.8	< 30.1	9.3	154.2	
		FINE	543	15.0	34.0	3.8	3.6	< 4.7	< 37.6	8.5	742.9	CA
		TOTAL (<15 MICROMETRES)		16.7	70.0	7.1	[illegible]	< 8.5	< 67.7	17.8	897.1	
TORONTO(CURB) 29NOV80 NAPS NO. 56.0	1431	COARSE	544	1.7	25.8	0.6	0.3	< 3.7	< 29.8	4.4	99.5	
		FINE	545	15.0	18.2	1.5	3.6	< 4.6	< 37.2	14.9	427.7	
		TOTAL (<15 MICROMETRES)		16.7	44.0	2.0	4.0	< 8.4	< 67.0	19.2	527.2	

COMMENT CODES
****

A - MISSING
C - COARSE

D - VOID
F - FINE

APPENDIX III

FIELD BLANK FILTERS

SUMMARY OF BLANK FILTER DATA - Values are in µg/filter

\- N.A. = not available

CITY AND FILTER	MASS INCREASE	SULPHATE	ARSENIC	CADMIUM	LEAD	CHROMIUM	EXPOSURE DURATION
HALIFAX 204	185	21.4	<0.20	<0.8	<0.8	0.14	48 hours
HALIFAX 205	229	< 2.6	<0.20	<0.8	<0.8	<0.12	N/A
HALIFAX 315	120	3.2	<0.20	<0.8	<0.8	N/A	48 hours
HALIFAX 316	129	3.6	<0.20	<0.8	<0.8	N/A	48 hours
HALIFAX N/A	22	6.0	N/A	N/A	N/A	N/A	48 hours
HALIFAX N/A	100	< 2.6	N/A	N/A	N/A	N/A	48 hours
HALIFAX N/A	127	N/A	N/A	N/A	N/A	N/A	48 hours
HALIFAX N/A	49	N/A	N/A	N/A	N/A	N/A	48 hours
HALIFAX N/A	165	<2.6	N/A	N/A	N/A	N/A	48 hours
MONTREAL N/A	12	<2.6	<0.10	<0.8	<0.8	< 0.12	48 hours
MONTREAL N/A	7	<2.6	N/A	N/A	N/A	N/A	N/A
MONTREAL N/A	4	3.5	N/A	N/A	N/A	N/A	N/A
MONTREAL N/A	102	7.0	N/A	N/A	N/A	N/A	N/A
MONTREAL 682	N/A	N/A	N/A	N/A	N/A	N/A	15 hours
MONTREAL 683	N/A	N/A	N/A	N/A	N/A	N/A	15 hours

The analytical data from the field blanks is presented in the following table. Using 20 m^3 as a typical sample volume the average expected blank values were calculated from the survey means found at the end of the data table. The results of these calculations were as follows:

Mass - 5.9 $\mu g/m^3$
Sulphate - < 0.3 $\mu g/m^3$
Arsenic - < 0.01 $\mu g/m^3$
Cadmium - < 0.04 $\mu g/m^3$
Lead - < 0.045 $\mu g/m^3$
Chromium - < 0.007 $\mu g/m^3$

As is readily apparent these values, with the exception of the mass loading are all extremely low.

CITY AND FILTER	MASS INCREASE	SULPHATE	ARSENIC	CADMIUM	LEAD	CHROMIUM	EXPOSURE DURATION
EDMONTON 278	N/A	N/A	N/A	N/A	N/A	N/A	44 hours
EDMONTON N/A	2	<2.6	<0.10	< 0.8	< 0.8	< 0.04	N/A
EDMONTON N/A	134	9.0	N/A	N/A	N/A	N/A	N/A
EDMONTON N/A	102	9.0	N/A	N/A	N/A	N/A	N/A
EDMONTON N/A	310	<2.6	N/A	N/A	N/A	N/A	N/A
EDMONTON N/A	431	<2.6	N/A	N/A	N/A	N/A	N/A
VANCOUVER 246	121	<2.6	<0.10	< 0.8	< 0.8	0.16	N/A
VANCOUVER 251	34	<2.6	<0.10	< 0.8	1.2	N/A	36 hours
VANCOUVER 252	N/A	N/A	N/A	N/A	N/A	N/A	36 hours
VANCOUVER N/A	96	<2.6	N/A	N/A	N/A	N/A	36 hours
VANCOUVER N/A	210	<2.6	N/A	N/A	N/A	N/A	36 hours
VANCOUVER N/A	78	9.0	N/A	N/A	N/A	N/A	36 hours
VANCOUVER N/A	52	6.3	N/A	N/A	N/A	N/A	36 hours
WINNIPEG 286	190	<2.6	<0.10	< 0.8	1.6	0.16	48 hours
WINNIPEG N/A	177	<2.6	<0.10	< 0.8	< 0.8	N/A	48 hours

CITY AND FILTER	MASS INCREASE	SULPHATE	ARSENIC	CADMIUM	LEAD	CHROMIUM	EXPOSURE DURATION
WINNIPEG N/A	95	< 2.6	N/A	N/A	N/A	N/A	N/A
WINNIPEG N/A	56	< 2.6	N/A	N/A	N/A	N/A	N/A
WINNIPEG N/A	212	< 2.6	N/A	N/A	N/A	N/A	N/A
WINNIPEG N/A	331	< 2.6	N/A	N/A	N/A	N/A	N/A
WINNIPEG N/A	375	< 2.6	N/A	N/A	N/A	N/A	N/A
WINNIPEG N/A	215	22.6	N/A	N/A	N/A	N/A	N/A
TORONTO 400	41	< 2.6	< 0.10	< 0.8	1.0	0.10	27 hours
TORONTO 401	177	8.4	0.10	< 0.8	< 0.8	0.10	27 hours
TORONTO 570	255	22.0	N/A	N/A	N/A	N/A	168 hours
TORONTO 571	N/A	N/A	N/A	N/A	N/A	N/A	168 hours
OTTAWA 227	N/A	N/A	N/A	N/A	N/A	N/A	N/A
OTTAWA 387C	134	< 2.6	< 0.10	< 0.8	1.0	< 0.04	25¼ hours
OTTAWA 388	75	< 2.6	< 0.10	< 0.8	1.0	0.10	25¼ hours
OTTAWA 495	45	32.8	N/A	N/A	N/A	N/A	10½ hours
OTTAWA 496	80	0.9	N/A	N/A	N/A	N/A	10½ hours

CITY AND FILTER	MASS INCREASE	SULPHATE	ARSENIC	CADMIUM	LEAD	CHROMIUM	EXPOSURE DURATION
OTTAWA N/A	205	< 2.6	N/A	N/A	N/A	N/A	N/A
OTTAWA N/A	165	< 2.6	N/A	N/A	N/A	N/A	N/A
OTTAWA 720	132	< 2.6	N/A	N/A	N/A	N/A	24 hours
OTTAWA 721	-137	7.2	N/A	N/A	N/A	N/A	N/A
TORONTO N/A CURBSIDE	38	< 2.6	< 0.10	< 0.8	< 0.8	0.26	N/A
TORONTO N/A CURBSIDE	89	< 2.6	< 0.10	< 0.8	< 0.8	0.16	N/A
TORONTO 570 CURBSIDE	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TORONTO 571 CURBSIDE	N/A	N/A	N/A	N/A	N/A	N/A	N/A
OTTAWA 391 CURBSIDE	100	12.8	< 0.10	< 0.8	1.0	0.08	25 hours
OTTAWA 392 CURBSIDE	47	7.2	< 0.10	< 0.8	1.0	0.28	25 hours
OTTAWA 497 CURBSIDE	125	3.0	N/A	N/A	N/A	N/A	23 hours
OTTAWA 498 CURBSIDE	-250	N/A	N/A	N/A	N/A	N/A	23 hours
SURVEY MEAN	118	5.7	0.12	< 0.8	0.9	0.13	-

APPENDIX IV

STATISTICAL ANALYSIS

Key to sample codes used in the correlation tables:

TSP indicates HIVOL sampler data

DIC indicates DICHOTOMOUS sampler data

CITY = HA , HAlifax

= MO , MOntreal

= OC , Ottawa-Curb

= OT , OTtawa-roof

= TC , Toronto-Curb

= TO , TOronto-roof

= WI , WInnipeg

= ED , EDmonton

= VA , VAncouver

HiVol Data

MASSTSP - mass

SO4TSP - sulphate

NO3TSP - nitrate

PBTSP - lead

CDTSP - cadmium

CRTSP - chromium

ASTSP - arsenic

Dichotomous Data

FLOWF, FLOWC, FLOWT - flow rates - disregard

DATE - date - disregard

MASSDICC - coarse mass

MASSDICF - fine mass

MASSDICT - total mass

SO4DICC - coarse sulphate

SO4DICF - fine sulphate

SO4DICT - total sulphate

NO3DICC - coarse nitrate - disregard

NO3DICF - fine nitrate - disregard

NO3DICT - total nitrate - disregard

ASDICC - coarse arsenic

ASDICF - fine arsenic

ASDICT - total arsenic

CDDICC - coarse cadmium - disregard

CDDICF - fine cadmium - disregard

CDDICT - total cadmium - disregard

CRDICC - coarse chromium

CRDICF - fine chromium

CRDICT - total chromium

PBDICC - coarse lead

PBDICF - fine lead

PBDICT - total lead

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                        CORRELATION OF TSP DATA BY CITY
                                 CITYTSP=HA

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

             MASSTSP    SO4TSP    NO3TSP     PBTSP     CDTSP     CRTSP     ASTSP

MASSTSP      1.00000   0.65322   0.38369   0.58436
              0.0000    0.0213    0.2182    0.0460
                  12        12        12        12         0         0         0
SO4TSP       0.65322   1.00000   0.65488   0.64473
              0.0213    0.0000    0.0208    0.0236
                  12        12        12        12         0         0         0
NO3TSP       0.38369   0.65488   1.00000   0.48293
              0.2182    0.0208    0.0000    0.1118
                  12        12        12        12         0         0         0
PBTSP        0.58436   0.64473   0.48293   1.00000
              0.0460    0.0236    0.1118    0.0000
                  12        12        12        12         0         0         0
CDTSP

                   0         0         0         0         0         0         0
CRTSP

                   0         0         0         0         0         0         0
ASTSP

                   0         0         0         0         0         0         0
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                              CORRELATION OF TSP DATA BY CITY
                                       CITYTSP=MO

 CORRELATION COEFFICIENTS / PROB > |R| UNDER H0:RHO=0 / NUMBER OF OBSERVATIONS

              MASSTSP     SO4TSP     NO3TSP      PBTSP      CDTSP      CRTSP      ASTSP

 MASSTSP      1.00000    0.23237    0.39039    0.45043
               0.0000     0.2980     0.0725     0.0354
                   22         22         22         22          0          0          0

 SO4TSP       0.23237    1.00000    0.76523    0.52644
               0.2980     0.0000     0.0001     0.0118
                   22         22         22         22          0          0          0

 NO3TSP       0.39039    0.76523    1.00000    0.55291
               0.0725     0.0001     0.0000     0.0076
                   22         22         22         22          0          0          0

 PBTSP        0.45043    0.52644    0.55291    1.00000
               0.0354     0.0118     0.0076     0.0000
                   22         22         22         22          0          0          0

 CDTSP

                    0          0          0          0          0          0          0

 CRTSP

                    0          0          0          0          0          0          0

 ASTSP

                    0          0          0          0          0          0          0
```

```
                         CCRRELATION OF TSP DATA BY CITY
                                  CITYTSP=OC

CCRRELATION CCEFFICIENTS / PRCB > |R| UNDER HO:RHO=C / NUMBER OF OBSERVATIONS

             MASSTSP     SC4TSP     NC3TSP      PBTSP      CDTSP      CRTSP      ASTSP

MASSTSP      1.00000                          0.84248
              0.0000                           0.0001
                  17          0          0         17          0          0          0

SO4TSP

                   0          0          0          0          0          0          0

NO3TSP

                   0          0          0          0          0          0          0

PBTSP        0.84248                          1.00000
              0.0001                           0.0000
                  17          0          0         17          0          0          0

CDTSP

                   0          0          0          0          C          0          0

CRTSP

                   0          0          0          0          0          0          0

ASTSP

                   0          0          0          0          0          0          C
```

```
                              CORRELATION OF TSP DATA BY CITY
                                        CITYTSP=CT

       CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS
                   MASSTSP     SO4TSP      NO3TSP      PBTSP       CDTSP       CRTSP       ASTSP

      MASSTSP      1.00000     0.58236     0.62863     0.78001
                    0.0000      0.0036      0.0013      0.0001
                        23          23          23          23           0           0           0
      SO4TSP       0.58236     1.00000     0.62574     0.36452
                    0.0036      0.0000      0.0014      0.0872
                        23          23          23          23           0           0           0
      NO3TSP       0.62863     0.62574     1.00000     0.65323
                    0.0013      0.0014      0.0000      0.0007
                        23          23          23          23           0           0           0
      PBTSP        0.78001     0.36452     0.65323     1.00000
                    0.0001      0.0872      0.0007      0.0000
                        23          23          23          23           0           0           0
      CDTSP

                         0           0           0           0           0           0           0
      CRTSP

                         0           0           0           0           0           0           0
      ASTSP

                         0           0           0           0           0           0           0
```

```
                          CORRELATION OF TSP DATA BY CITY
                                  CITYTSP=TC

  CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

             MASSTSP     SO4TSP     NO3TSP      PBTSP      CDTSP      CRTSP      ASTSP

 MASSTSP     1.00000                           0.81402
              0.0000                            0.0001
                  19          0          0         19          0          0          0

 SO4TSP

                   0          0          0          0          0          0          0

 NO3TSP

                   0          0          0          0          0          0          0

 PBTSP       0.81402                           1.00000
              0.0001                            0.0000
                  19          0          0         19          0          0          0

 CDTSP

                   0          0          0          0          0          0          0

 CRTSP

                   0          0          0          0          0          0          0

 ASTSP

                   0          0          0          0          0          0          0
```

```
                         CORRELATION OF TSP DATA BY CITY
                                  CITYTSP=TO

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

              MASSTSP      SO4TSP      NO3TSP       PBTSP      CDTSP      CRTSP      ASTSP

MASSTSP       1.00000     0.42015     0.51288     0.61807
               0.0000      0.0931      0.0353      0.0022
                   22          17          17          22          0          0          0

SO4TSP        0.42015     1.00000     0.92623     0.61471
               0.0931      0.0000      0.0001      0.0086
                   17          17          17          17          0          0          0

NO3TSP        0.51288     0.92623     1.00000     0.73445
               0.0353      0.0001      0.0000      0.0008
                   17          17          17          17          0          0          0

PBTSP         0.61807     0.61471     0.73445     1.00000
               0.0022      0.0086      0.0008      0.0000
                   22          17          17          22          0          0          0

CDTSP

                    0           0           0           0          0          0          0

CRTSP

                    0           0           0           0          0          0          0

ASTSP

                    0           0           0           0          0          0          0
```

```
                         CORRELATION OF TSP DATA BY CITY
                                  CITYTSP=WI

 CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

            MASSTSP    SO4TSP    NO3TSP     PBTSP     CDTSP     CRTSP     ASTSP

MASSTSP     1.00000  -0.00629   0.00794   0.47719   0.02525  -0.00693   0.32039
             0.0000    0.9816    0.9767    0.0388    0.9183    0.9775    0.1811
                 19        16        16        19        19        19        19

SO4TSP     -0.00629   1.00000   0.23384   0.03688   0.10407   0.66259   0.24997
             0.9816    0.0000    0.3834    0.8921    0.7013    0.0052    0.3504
                 16        16        16        16        16        16        16

NO3TSP      0.00794   0.23384   1.00000   0.60810  -0.03488  -0.17889  -0.10916
             0.9767    0.3834    0.0000    0.0124    0.8979    0.5074    0.6874
                 16        16        16        16        16        16        16

PBTSP       0.47719   0.03688   0.60810   1.00000   0.36913  -0.08540   0.04625
             0.0388    0.8921    0.0124    0.0000    0.1199    0.7281    0.8509
                 19        16        16        19        19        19        19

CDTSP       0.02525   0.10407  -0.03488   0.36913   1.00000   0.33118   0.29723
             0.9183    0.7013    0.8979    0.1199    0.0000    0.1660    0.2165
                 19        16        16        19        19        19        19

CRTSP      -0.00693   0.66259  -0.17889  -0.08540   0.33118   1.00000   0.35080
             0.9775    0.0052    0.5074    0.7281    0.1660    0.0000    0.1409
                 19        16        16        19        19        19        19

ASTSP       0.32039   0.24997  -0.10916   0.04625   0.29723   0.35080   1.00000
             0.1811    0.3504    0.6874    0.8509    0.2165    0.1409    0.0000
                 19        16        16        19        19        19        19
```

```
                          CORRELATION OF TSP DATA BY CITY
                                    CITYTSP=ED

CCRRELATION COEFFICIENTS / PRCB > |R| UNDER HC:RHO=C / NUMBER OF OBSERVATIONS

             MASSTSP     SO4TSP     NC3TSP     PBTSP     CDTSF     CRTSP     ASTSP

MASSTSP      1.00000
              0.0000
                  20          0          0         0         0         0         0
SO4TSP

                   0          0          0         0         0         0         0
NO3TSP

                   0          0          0         0         0         0         0
PBTSF

                   0          0          0         0         0         0         0
CDTSF

                   0          0          0         0         0         0         0
CRTSF

                   0          0          0         0         0         0         0
ASTSF

                   0          0          0         0         C         0         0
```

```
                                 CORRELATION OF TSP DATA BY CITY
                                          CITYTSP=VA

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

               MASSTSP      SO4TSP      NO3TSP       PBTSP       CDTSP       CRTSP       ASTSP

MASSTSP        1.00000     0.88311     0.86485     0.83742
                0.0000      0.0001      0.0003      0.0007
                    12          12          12          12           0           0           0

SO4TSP         0.88311     1.00000     0.82240     0.83194
                0.0001      0.0000      0.0010      0.0008
                    12          12          12          12           0           0           0

NO3TSP         0.86485     0.82240     1.00000     0.70331
                0.0003      0.0010      0.0000      0.0107
                    12          12          12          12           0           0           0

PBTSP          0.83742     0.83194     0.70331     1.00000
                0.0007      0.0008      0.0107      0.0000
                    12          12          12          12           0           0           0

CDTSP

                     0           0           0           0           0           0           0

CRTSP

                     0           0           0           0           0           0           0

ASTSP

                     0           0           0           0           0           0           0
```

```
                         CORRELATION ANALYSIS OF DIC DATA CCARSE VS FINE VS TOTAL BY CITY
                                                     CITY=HA

                     CORRELATION CCEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

          MASSDICC   ASDICC   CRDICC   PBDICC     DATE  SO4DICC MASSDICF   ASDICF   CRDICF   PBDICF  SO4DICF MASSDICT   ASDICT   CRDICT   PBDICT  SO4DICT

MASSDICC   1.00000  0.82506  0.37836  0.14689  0.34645  0.24516  0.53288  0.61352 -0.21666  0.56218  0.50924  0.92811  0.89754  0.03637  0.54659  0.56150
            0.0000   0.0432   0.2512   0.6014   0.1345   0.3982   0.0156   0.1952   0.5222   0.0292   0.0629   0.0001   0.0331   0.9142   0.0350   0.0458
                20        6       11       15       20       14       20        6       11       15       14       20        5       11       15       13

ASDICC     0.82506  1.00000  0.50000  0.21868 -0.80826  0.58457  0.33818  0.40007 -0.19424  0.24751 -0.07132  0.66458  0.80472 -0.01544  0.27706  0.02120
            0.0432   0.0000   0.6667   0.6772   0.0516   0.2191   0.5121   0.4319   0.8756   0.6363   0.8932   0.1499   0.0535   0.9902   0.5950   0.9682
                 6        6        3        6        6        6        6        6        3        6        6        6        5        3        6        6

CRDICC     0.37836  0.50000  1.00000  0.56186  0.33471 -0.44579  0.41546  0.00000 -0.11919  0.18035  0.45551  0.42907  0.50000  0.48966  0.35271  0.57721
            0.2512   0.6667   0.0000   0.0720   0.3144   0.2291   0.2036   1.0000   0.7270   0.5957   0.2179   0.1879   0.6667   0.1263   0.2874   0.1341
                11        3       11       11       11        9       11        3       11       11        9       11     Y(3)       11       11        8

PBDICC     0.14689  0.21868  0.56186  1.00000  0.27379 -0.14908  0.19501  0.16984  0.20866  0.18305  0.25154  0.19067  0.22932  0.51513  0.49040  0.38789
            0.6014   0.6772   0.0720   0.0000   0.3234   0.6209   0.4861   0.7477   0.5381   0.5138   0.4071   0.4961   0.6621   0.1049   0.0635   0.2128
                15        6       11       15       15       13       15        6       11       15       13       15        5       11       15       12

DATE       0.34645 -0.80523  0.33471  0.27379  1.00000 -0.29603  0.74561  0.18530 -0.00227  0.41535  0.65256  0.65825 -0.32094  0.19746  0.45794  0.64032
            0.1345   0.0516   0.3144   0.3234   0.0000   0.3041   0.0002   0.7252   0.9947   0.1237   0.0114   0.0016   0.5351   0.5606   0.0861   0.0184
                20        6       11       15       20       14       20        6       11       15       14       20        5       11       15       13

SO4DICC    0.24516  0.58457 -0.44579 -0.14908 -0.29603  1.00000 -0.36271  0.73255 -0.37001  0.15335 -0.31761 -0.12275  0.79950 -0.53067  0.09159 -0.18279
            0.3982   0.2191   0.2291   0.6209   0.3041   0.0000   0.2025   0.0536   0.3270   0.6169   0.2685   0.6759   0.0563   0.1416   0.7660   0.5500
                14        6        9       13       14       14       14        6        9       13       14       14        5        9       13       13

MASSDICF   0.53288  0.33818  0.41546  0.19501  0.74561 -0.36271  1.00000  0.77311 -0.15023  0.60464  0.67946  0.91562  0.68529  0.11509  0.60020  0.63541
            0.0156   0.5121   0.2039   0.4861   0.0002   0.2025   0.0000   0.0714   0.6593   0.0170   0.0075   0.0001   0.1330   0.7362   0.0180   0.0196
                20        6       11       15       20       14       20        6       11       15       14       20        5       11       15       13

ASDICF     0.61352  0.40007  0.00000  0.16984  0.18530  0.73655  0.77311  1.00000  0.00000  0.96085  0.16460  0.81122  0.86603  0.00000  0.88095  0.27305
            0.1952   0.4319   1.0000   0.7477   0.7252   0.0936   0.0714   0.0000   1.0000   0.0023   0.7553   0.0501   0.0257   1.0000   0.0204   0.6006
                 6        6        3        6        6        6        6        6        3        6        6        6        5        3        6        6

CRDICF    -0.21666 -0.19424 -0.11919  0.20866 -0.00227 -0.37001 -0.15023  0.00000  1.00000 -0.34318 -0.03475 -0.19417 -0.19424  0.80731 -0.23440 -0.02124
            0.5222   0.8756   0.7270   0.5381   0.9947   0.3270   0.6593   1.0000   0.0000   0.3015   0.9293   0.5673   0.8755   0.0027   0.4878   0.9602
                11        3       11       11       11        9       11        3       11       11        9       11        3       11       11        9

PBDICF     0.56218  0.24751  0.18035  0.18305  0.41535  0.15335  0.60464  0.96085 -0.34318  1.00000  0.32445  0.64274  0.75743 -0.19214  0.94654  0.34851
            0.0292   0.6363   0.5957   0.5139   0.1237   0.6169   0.0170   0.0023   0.3015   0.0000   0.2794   0.0098   0.0811   0.5714   0.0001   0.2669
                15        6       11       15       15       13       15        6       11       15       13       15        5       11       15       12

SO4DICF    0.50924 -0.07132  0.45551  0.25154  0.65256 -0.31761  0.67946  0.16460 -0.03475  0.32445  1.00000  0.66737  0.06771  0.21647  0.35654  0.98760
            0.0629   0.8932   0.2179   0.4071   0.0114   0.2685   0.0075   0.7553   0.9293   0.2794   0.0000   0.0091   0.8955   0.5759   0.2290   0.0001
                14        6        9       13       14       14       14        6        9       13       14       14        5        9       13       13

MASSDICT   0.92811  0.66458  0.42907  0.19067  0.65825 -0.12275  0.91562  0.81122 -0.19417  0.64274  0.66737  1.00000  0.88805  0.08563  0.63249  0.66463
            0.0001   0.1499   0.1879   0.4961   0.0016   0.6759   0.0001   0.0501   0.5673   0.0098   0.0091   0.0000   0.0181   0.8023   0.0114   0.0132
                20        6       11       15       20       14       20        6       11       15       14       20        5       11       15       13

ASDICT     0.89754  0.80472  0.50000  0.22932 -0.32094  0.79950  0.68529  0.86603 -0.19424  0.75743  0.06771  0.88805  1.00000 -0.01544  0.72180  0.18844
            0.0331   0.0525   0.6667   0.6621   0.5351   0.0563   0.1330   0.0257   0.8756   0.0811   0.8986   0.0181   0.0000   0.9902   0.1053   0.7207
                 5        5        3        5        5        5        5        5        3        5        5        5        5        3        5        5

CRDICT     0.03637 -0.01544  0.48966  0.51513  0.19746 -0.53067  0.11509  0.00000  0.80731 -0.19214  0.21647  0.08563 -0.01544  1.00000  0.00490  0.32493
            0.9142   0.9902   0.1263   0.1049   0.5606   0.1416   0.7362   1.0000   0.0027   0.5714   0.5759   0.8023   0.9902   0.0000   0.9886   0.4323
                11        3       11       11       11        9       11        3       11       11        9       11        3       11       11        8

PBDICT     0.54659  0.27706  0.35271  0.49040  0.45794  0.09159  0.60020  0.88095 -0.23440  0.94654  0.35854  0.63249  0.72180  0.00490  1.00000  0.38015
            0.0350   0.5950   0.2874   0.0635   0.0861   0.7660   0.0180   0.0204   0.4878   0.0001   0.2290   0.0114   0.1053   0.9886   0.0000   0.2229
                15        6       11       15       15       13       15        6       11       15       13       15        5       11       15       12

SO4DICT    0.56150  0.02120  0.57721  0.38789  0.64032 -0.18279  0.63541  0.27305 -0.02124  0.34851  0.98760  0.66463  0.18844  0.32493  0.38015  1.00000
            0.0458   0.9682   0.1341   0.2128   0.0184   0.5500   0.0196   0.6006   0.9602   0.2669   0.0001
```

```
                                 CORRELATION ANALYSIS OF DIC DATA C VS F VS T BY CITY SEASON
                                                 CITY=HA    SEASON=FALL

                     CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

            MASSDICC    ASDICC    CRDICC    PBDICC      DATE   SO4DICC  MASSDICF    ASDICF    CRDICF    PBDICF   SO4DICF  MASSDICT    ASDICT    CRDICT    PBDICT   SO4DICT

MASSDICC     1.00000   0.82506  -0.14104   0.07078  -0.36836   0.83327   0.10899   0.61352  -0.27416   0.42805   0.02658   0.78125   0.84754  -0.35524   0.34968   0.19727
              0.0000    0.0432    0.7898    0.8564    0.2387    0.0102    0.7360    0.1952    0.5991    0.2504    0.9502    0.0027    0.0331    0.4896    0.3559    0.6396
                  12         6         6         9        12         8        12         6         6         9         8        12         6         6         9         8

ASDICC       0.82506   1.00000   0.50000   0.21368  -0.80929   0.58857   0.33818   0.40007  -0.19424   0.24751  -0.07132   0.66458   0.80472  -0.01544   0.27706   0.02120
              0.0432    0.0000    0.6667    0.6772    0.0516    0.2191    0.5121    0.4319    0.8756    0.6363    0.8932    0.1499    0.0535    0.9902    0.5950    0.9682
                   6         6         3         6         6         6         6         6         3         6         6         6         6         3         6         6

CRDICC      -0.14104   0.50000   1.00000   0.24457  -0.38645  -0.26005  -0.43198   0.00000  -0.36624   0.46626  -0.79612  -0.33098   0.50000   0.03096   0.37760  -0.62048
              0.7898    0.6667    0.0000    0.6405    0.4492    0.6727    0.3923    1.0000    0.4752    0.3513    0.1071    0.5217    0.6667    0.9536    0.4605    0.2641
                   6         3         6         6         6         5         6         3         6         6         5         6      Y(3)         6         6         5

PBDICC       0.07078   0.21368   0.24457   1.00000   0.20674   0.24315   0.14462   0.16984   0.35992   0.20310   0.00545   0.13954   0.22932   0.49190   0.55977   0.06440
              0.8564    0.6772    0.6405    0.0000    0.5936    0.5617    0.7105    0.7477    0.4834    0.6002    0.9898    0.7203    0.6621    0.3217    0.1170    0.8796
                   9         6         6         9         9         8         9         6         6         9         8         9         6         6         9         8

DATE        -0.36836  -0.80929  -0.38645   0.20674   1.00000   0.36392   0.03124   0.18530   0.11586   0.08265   0.29045  -0.24295  -0.32094  -0.04933   0.14990   0.35081
              0.2387    0.0516    0.4492    0.5936    0.0000    0.3755    0.9232    0.7252    0.8270    0.8326    0.4853    0.4467    0.5351    0.9261    0.7003    0.3942
                  12         6         6         9        12         8        12         6         6         9         8        12         6         6         9         8

SO4DICC      0.83327   0.58857  -0.26005   0.24315   0.36392   1.00000  -0.09163   0.73855  -0.46918   0.37780  -0.08019   0.45135   0.79950  -0.59313   0.38661   0.11988
              0.0102    0.2191    0.6727    0.5617    0.3755    0.0000    0.8291    0.0936    0.4253    0.3561    0.8503    0.2616    0.0563    0.2918    0.3441    0.7774
                   8         6         5         8         8         8         8         6         5         8         8         8         6         5         8         8

MASSDICF     0.10899   0.33818  -0.43198   0.14462   0.03124  -0.09163   1.00000   0.77311   0.57203   0.60330   0.58715   0.70566   0.68529   0.42160   0.56700   0.56692
              0.7360    0.5121    0.3923    0.7105    0.9232    0.8291    0.0000    0.0714    0.2355    0.0854    0.1259    0.0103    0.1330    0.4051    0.1114    0.1428
                  12         6         6         9        12         8        12         6         6         9         8        12         6         6         9         8

ASDICF       0.61352   0.40007   0.00000   0.16984   0.18530   0.73855   0.77311   1.00000   0.00000   0.96085   0.16460   0.81122   0.86603   0.00000   0.88095   0.27305
              0.1952    0.4319    1.0000    0.7477    0.7252    0.0936    0.0714    0.0000    1.0000    0.0023    0.7553    0.0501    0.0257    1.0000    0.0204    0.6006
                   6         6         3         6         6         6         6         6         3         6         6         6         6         3         6         6

CRDICF      -0.27416  -0.19424  -0.36624   0.35992   0.11586  -0.46918   0.57203   0.00000   1.00000   0.23777   0.36902   0.00312  -0.19424   0.91064   0.38746  -0.01049
              0.5991    0.8756    0.4752    0.4834    0.8270    0.4253    0.2355    1.0000    0.0000    0.6501    0.5410    0.9953    0.8756    0.0116    0.4479    0.9866
                   6         3         6         6         6         5         6         3         6         6         5         6         3         6         6         5

PBDICF       0.42805   0.24751   0.46626   0.20310   0.08265   0.37780   0.60330   0.96085   0.23777   1.00000   0.05135   0.66598   0.75743   0.46228   0.92506   0.12440
              0.2504    0.6363    0.3513    0.6002    0.8326    0.3561    0.0854    0.0023    0.6501    0.0000    0.9039    0.0502    0.0811    0.3560    0.0004    0.7692
                   9         6         6         9         9         8         9         6         6         9         8         9         6         6         9         8

SO4DICF      0.02658  -0.07132  -0.79612   0.00545   0.29045  -0.08019   0.58715   0.16460   0.36902   0.05135   1.00000   0.40422   0.06771   0.02528   0.04483   0.97980
              0.9502    0.8932    0.1071    0.9898    0.4853    0.8503    0.1259    0.7553    0.5410    0.9039    0.0000    0.3206    0.8986    0.9678    0.9161    0.0001
                   8         6         5         8         8         8         8         6         5         8         8         8         6         5         8         8

MASSDICT     0.78125   0.66458  -0.33098   0.13954  -0.24295   0.45135   0.70566   0.81122   0.00312   0.66598   0.40422   1.00000   0.88805  -0.14231   0.61794   0.49572
              0.0027    0.1499    0.5217    0.7203    0.4467    0.2616    0.0103    0.0501    0.9953    0.0502    0.3206    0.0000    0.0181    0.7880    0.0761    0.2116
                  12         6         6         9        12         8        12         6         6         9         8        12         6         6         9         8

ASDICT       0.84754   0.80472   0.50000   0.22932  -0.32094   0.79950   0.68529   0.86603  -0.19424   0.75743   0.06771   0.88805   1.00000  -0.01544   0.72180   0.18844
              0.0331    0.0535    0.6667    0.6621    0.5351    0.0563    0.1330    0.0257    0.8756    0.0811    0.8986    0.0181    0.0000    0.9902    0.1053    0.7207
                   6         6         3         6         6         6         6         6         3         6         6         6         6         3         6         6

RDICT       -0.35524  -0.01544   0.03096   0.49190  -0.04933  -0.59313   0.42160   0.00000   0.91064   0.46228   0.02528  -0.14231  -0.01544   1.00000   0.58108  -0.28426
              0.4896    0.9902    0.9536    0.3217    0.9261    0.2918    0.4051    1.0000    0.0116    0.3560    0.9678    0.7880    0.9902    0.0000    0.2265    0.6430
                   6         3         6         6         6         5         6         3         6         6         5         6         3         6         6         5

BDICT        0.34968   0.27706   0.37760   0.55977   0.14990   0.38661   0.56700   0.88095   0.38746   0.92506   0.04483   0.61794   0.72180   0.58108   1.00000   0.12291
              0.3559    0.5950    0.4605    0.1170    0.7003    0.3441    0.1114    0.0204    0.4479    0.0004    0.9161    0.0761    0.1053    0.2265    0.0000    0.7718
                   9         6         6         9         9         8         9         6         6         9         8         9         6         6         9         8

4DICT        0.19727   0.02120  -0.62048   0.06440   0.35081   0.11988   0.56692   0.27305  -0.01049   0.12440   0.97980   0.49572   0.18844  -0.28426   0.12291   1.00000
              0.6396    0.9682    0.2641    0.8796    0.3942    0.7774    0.1428    0.6006    0.9866    0.7692    0.0001    0.2116    0.7207
                   8         6         5         8         8         8         8         6         5         8         8
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                              CORRELATION ANALYSIS OF CIC DATA C VS F VS T BY CITY SEASON
                                           CITY=HA   SEASON=WINT

                        CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

            MASSDICC    ASDICC    CRDICC    PBDICC      DATE   SO4DICC  MASSDICF    ASDICF    CRDICF    PBDICF   SO4DICF  MASSDICT    ASDICT    CRDICT    PBDICT   SO4DICT

MASSDICC     1.00000              0.12202  -0.20382   0.75616   0.67214   0.65492             -0.38288   0.54513   0.67536   0.89301             -0.22777   0.47254   0.61836
              0.0000               0.8450    0.6985    0.0299    0.1436    0.0780              0.5247    0.2633    0.1410    0.0028              0.7125    0.3439    0.2657
                   8         0          5         6         8         6         8         0         5         6         6         8         0         5         6         5

ASDICC
                   0         0          0         0         0         0         0         0         0         0         0         0         0         0         0         0

CRDICC       0.12202              1.00000   0.72630  -0.55451  -0.11742  -0.08304              0.02091  -0.31214  -0.01309   0.01112              0.60534  -0.10390   0.90229
              0.8450               0.0000    0.1646    0.3320    0.8826    0.8944              0.9734    0.6091    0.9869    0.9858              0.2793    0.8677    0.2935
                   5         0          5         5         5         4         5         0         5         5         4         5         0         5         5         3

PBDICC      -0.20382              0.72630   1.00000  -0.71030   0.36405  -0.39979             -0.05477  -0.02831  -0.54751  -0.34361              0.38378   0.24730   0.12222
              0.6985               0.1646    0.0000    0.1137    0.5469    0.4323              0.9303    0.9576    0.3395    0.5049              0.5236    0.6366    0.8778
                   6         0          5         6         6         5         6         0         5         6         5         6         0         5         6         4

DATE         0.75616             -0.55451  -0.71030   1.00000   0.38846   0.79027             -0.45522   0.66377   0.41424   0.85143             -0.68529   0.44628   0.02472
              0.0299               0.3320    0.1137    0.0000    0.4466    0.0196              0.4411    0.1506    0.4142    0.0073              0.2016    0.3726    0.9685
                   8         0          5         6         8         6         8         0         5         6         6         8         0         5         6         5

SO4DICC      0.67214             -0.11742   0.36405   0.38846   1.00000   0.05971             -0.00240   0.52744   0.22244   0.36913             -0.03334   0.61165   0.50732
              0.1436               0.8826    0.5469    0.4466    0.0000    0.9105              0.9976    0.3610    0.6718    0.4715              0.9667    0.2730    0.3829
                   6         0          4         5         6         6         6         0         4         5         6         6         0         4         5         5

MASSDICF     0.65492             -0.08304  -0.39979   0.79027   0.05971   1.00000             -0.82561   0.61510   0.43733   0.92494             -0.70558   0.45685  -0.05598
              0.0780               0.8944    0.4323    0.0196    0.9105    0.0000              0.0851    0.1937    0.3858    0.0010              0.1831    0.3274    0.9288
                   8         0          5         6         8         6         8         0         5         6         6         8         0         5         5         5

ASDICF
                   0         0          0         0         0         0         0         0         0         0         0         0         0         0         0         0

CRDICF      -0.38288              0.02091  -0.05477  -0.45522  -0.00240  -0.82561              1.00000  -0.84019  -0.45274  -0.68054              0.80842  -0.84079   0.96637
              0.5247               0.9734    0.9303    0.4411    0.9976    0.0851              0.0000    0.0748    0.5473    0.2060              0.0977    0.0744    0.1656
                   5         0          5         5         5         4         5         0         5         5         4         5         0         5         5         3

PBDICF       0.54513             -0.31214  -0.02831   0.66377   0.52744   0.61510             -0.84019   1.00000   0.40910   0.65164             -0.84960   0.96155   0.11753
              0.2633               0.6091    0.9576    0.1506    0.3610    0.1937              0.0748    0.0000    0.4940    0.1609              0.0684    0.0022    0.8825
                   6         0          5         6         6         5         6         0         5         6         5         6         0         5         6         4

SO4DICF      0.67536             -0.01309  -0.54751   0.41424   0.22244   0.43733             -0.45274   0.40910   1.00000   0.59815             -0.31801   0.30650   0.99543
              0.1410               0.9869    0.3395    0.4142    0.6718    0.3858              0.5473    0.4940    0.0000    0.2098              0.6820    0.6160    0.0004
                   6         0          4         5         6         6         6         0         4         5         6         6         0         4         5         5

MASSDICT     0.89301              0.01112  -0.34361   0.85143   0.36913   0.92494             -0.68054   0.65164   0.59815   1.00000             -0.53226   0.53759   0.33092
              0.0028               0.9858    0.5049    0.0073    0.4715    0.0010              0.2060    0.1609    0.2098    0.0000              0.3558    0.2713    0.5865
                   8         0          5         6         8         6         8         0         5         6         6         8         0         5         6         5

ASDICT
                   0         0          0         0         0         0         0         0         0         0         0         0         0         0         0         0

CRDICT      -0.22777              0.60534   0.38378  -0.68525  -0.03334  -0.70558              0.80842  -0.84960  -0.31801  -0.53226              1.00000  -0.72760   0.94530
              0.7125               0.2793    0.5236    0.2016    0.9667    0.1831              0.0977    0.0684    0.6820    0.3558              0.0000    0.1635    0.2115
                   5         0          5         5         5         4         5         0         5         5         4         5         0         5         5         3

PBDICT       0.47254             -0.10390   0.24730   0.44828   0.61165   0.48685             -0.84079   0.96155   0.30650   0.53759             -0.72760   1.00000   0.11876
              0.3439               0.8679    0.6366    0.3726    0.2730    0.3274              0.0744    0.0022    0.6160    0.2713              0.1635    0.0000    0.9812
                   6         0          5         6         6         5         6         0         5         6         5         6         0         5         6         4

SO4DICT      0.61866              0.90229   0.12222   0.02472   0.50732  -0.05598              0.96637   0.11753   0.99543   0.33092              0.94530   0.11876   1.00000
              0.2657               0.2934    0.8778    0.9685    0.3829    0.9298              0.1656    0.8825    0.0004    0.5865              0.2115
                   5         0          3         4         5         5         5         0         3         4
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                    CORRELATION ANALYSIS OF DIC DATA COARSE VS FINE VS TOTAL BY CITY
                                              CITY=NO

                   CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

           MASSDICC    ASDICC    CRDICC    PBDICC      DATE   SO4DICC  MASSDICF    ASDICF    CRDICF    PBDICF   SO4DICF  MASSDICT    ASDICT    CRDICT    PBDICT   SO4DICT

MASSDICC    1.00000   0.32297   0.05655   0.49370   0.05023   0.17477  -0.16868   0.15634   0.06263   0.11612  -0.11572   0.60095   0.24804   0.06275   0.27921  -0.08620
             0.0000    0.3966    0.8293    0.0373    0.8199    0.4879    0.4417    0.6879    0.8113    0.6464    0.6475    0.0025    0.5199    0.8109    0.2018    0.7338
                 23         9        17        18        23        18        23         9        17        18        18        23         9        17        18        18

ASDICC      0.32297   1.00000  -0.26601  -0.33916  -0.61006  -0.06711  -0.27815   0.75807  -0.24728   0.05456  -0.29065   0.07590   0.92629  -0.27790  -0.04537  -0.28392
             0.3966    0.0000    0.5243    0.3719    0.0811    0.8745    0.4686    0.0179    0.5549    0.8891    0.4849    0.8461    0.0003    0.5051    0.9077    0.4956
                  9         9         8         9         9         8         9         9         8         9         8         9         9         8         9         8

CRDICC      0.05655  -0.26601   1.00000   0.01268  -0.49639  -0.45166  -0.27504  -0.32438   0.76260   0.39208  -0.37285  -0.16333  -0.31744   0.92863   0.34931  -0.43807
             0.8293    0.5243    0.0000    0.9615    0.0427    0.0791    0.2853    0.4331    0.0004    0.1196    0.1549    0.5311    0.4436    0.0001    0.1693    0.0897
                 17         8        17        17        17        16        17         8        17        17        16        17         8        17        17        16

PBDICC      0.49370  -0.33916   0.01268   1.00000   0.17104   0.22090   0.11402  -0.29600   0.05015   0.17228  -0.05498   0.47406  -0.33664   0.03488   0.51052  -0.02137
             0.0373    0.3719    0.9615    0.0000    0.4974    0.3942    0.6524    0.4393    0.8484    0.4942    0.8340    0.0469    0.3757    0.8943    0.0304    0.9351
                 18         9        17        18        18        17        18         9        17        18        17        18         9        17        18        17

DATE        0.05023  -0.61006  -0.49639   0.17104   1.00000   0.58406   0.52251  -0.26868  -0.26519  -0.01323   0.50146   0.45187  -0.45313  -0.39658   0.05010   0.58382
             0.8199    0.0811    0.0427    0.4974    0.0000    0.0109    0.0105    0.4845    0.3036    0.9584    0.0340    0.0304    0.2205    0.1150    0.8435    0.0110
                 23         9        17        18        23        18        23         9        17        18        18        23         9        17        18        18

SO4DICC     0.17477  -0.06711  -0.45166   0.22090   0.58406   1.00000   0.70810   0.42488  -0.31440   0.19519   0.00600   0.66866   0.22073  -0.40286   0.25189   0.16225
             0.4879    0.8745    0.0791    0.3942    0.0109    0.0000    0.0010    0.2940    0.2356    0.4528    0.9812    0.0024    0.5994    0.1218    0.3294    0.5201
                 18         8        16        17        18        18        18         8        16        17        18        18         8        16        17        18

MASSDICF   -0.16868  -0.27815  -0.27504   0.11402   0.52251   0.70810   1.00000  -0.08442  -0.00267   0.57585   0.23229   0.68514  -0.18460  -0.13666   0.54380   0.33936
             0.4417    0.4686    0.2853    0.6524    0.0105    0.0010    0.0000    0.8290    0.5919    0.0124    0.3536    0.0003    0.6344    0.6010    0.0197    0.1683
                 23         9        17        18        23        18        23         9        17        18        18        23         9        17        18        18

ASDICF      0.15634   0.75807  -0.32438  -0.29600  -0.26868   0.42488  -0.08442   1.00000  -0.57936  -0.15594  -0.15376   0.07168   0.94794  -0.50360  -0.20296  -0.11198
             0.6879    0.0179    0.4331    0.4393    0.4845    0.2940    0.8290    0.0000    0.1323    0.6887    0.7162    0.8546    0.0001    0.2032    0.6005    0.7918
                  9         9         8         9         9         8         9         9         8         9         8         9         9         8         9         8

CRDICF      0.06263  -0.24728   0.76260   0.05015  -0.26519  -0.31440  -0.00267  -0.57936   1.00000   0.52800  -0.02833   0.04878  -0.45531   0.94817   0.48283  -0.07841
             0.8113    0.5549    0.0004    0.8484    0.3036    0.2356    0.9919    0.1323    0.0000    0.0294    0.9171    0.8525    0.2569    0.0001    0.0496    0.7729
                 17         8        17        17        17        16        17         8        17        17        16        17         8        17        17        16

PBDICF      0.11612   0.05456   0.39208   0.17228  -0.01323   0.19519   0.57585  -0.15594   0.52800   1.00000   0.13183   0.51890  -0.06345   0.49547   0.93496   0.16054
             0.6464    0.8891    0.1196    0.4942    0.9584    0.4528    0.0124    0.6887    0.0294    0.0000    0.6140    0.0273    0.8712    0.0431    0.0001    0.5382
                 18         9        17        18        18        17        18         9        17        18        17        18         9        17        18        17

SO4DICF    -0.11572  -0.29065  -0.37285  -0.05498   0.50146   0.00600   0.23229  -0.15378  -0.02833   0.13183   1.00000   0.08367  -0.24115  -0.19966   0.09596   0.98762
             0.6475    0.4849    0.1549    0.8340    0.0340    0.9812    0.3536    0.7162    0.9171    0.6140    0.0000    0.7414    0.5653    0.4585    0.7141    0.0001
                 18         8        16        17        18        18        18         8        16        17        18        18         8        16        17        18

MASSDICT    0.60095   0.07590  -0.16333   0.47406   0.45187   0.66866   0.68514   0.07168   0.04878   0.51890   0.08367   1.00000   0.07847  -0.05304   0.62378   0.18720
             0.0025    0.8461    0.5311    0.0469    0.0304    0.0024    0.0003    0.8546    0.8525    0.0273    0.7414    0.0000    0.8410    0.8398    0.0057    0.4570
                 23         9        17        18        23        18        23         9        17        18        18        23         9        17        18        18

ASDICT      0.24804   0.92629  -0.31744  -0.33664  -0.45313   0.22073  -0.18460   0.94794  -0.45531  -0.06345  -0.24118   0.07847   1.00000  -0.42664  -0.13942  -0.21263
             0.5199    0.0003    0.4436    0.3757    0.2206    0.5994    0.6344    0.0001    0.2569    0.8712    0.5650    0.8410    0.0000    0.2918    0.7205    0.6132
                  9         9         8         9         9         8         9         9         8         9         8         9         9         8         9         8

CRDICT      0.06275  -0.27790   0.92863   0.03488  -0.39658  -0.40286  -0.13666  -0.50360   0.94817   0.49547  -0.19966  -0.05304  -0.42664   1.00000   0.44852  -0.26052
             0.8109    0.5051    0.0001    0.8943    0.1150    0.1218    0.6010    0.2032    0.0001    0.0431    0.4585    0.8398    0.2919    0.0000    0.0710    0.3298
                 17         8        17        17        17        16        17         8        17        17        16        17         8        17        17        16

PBDICT      0.27921  -0.04537   0.34931   0.51052   0.05010   0.25189   0.54380  -0.20296   0.48285   0.93496   0.09596   0.62378  -0.13942   0.44852   1.00000   0.13343
             0.2018    0.9077    0.1693    0.0304    0.8435    0.3294    0.0197    0.6005    0.0496    0.0001    0.7141    0.0057    0.7205    0.0710    0.0000    0.6097
                 18         9        17        18        18        17        18         9        17        18        17        18         9        17        18        17

SO4DICT    -0.08620  -0.28392  -0.43807  -0.02137   0.58382   0.16275   0.33936  -0.11198  -0.07841   0.16054   0.98762   0.18720  -0.21263  -0.26052   0.13343
             0.7338    0.4956    0.0897    0.9351    0.0110    0.5201    0.1683    0.7518    0.7729    0.5382    0.0001    0.4570
                 18         8        16        17        18        18        18         8        16        17
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                          CORRELATION ANALYSIS OF CIC DATA C VS F VS T BY CITY SEASON
                                           CITY=MO   SEASON=FALL

                 CORRELATION COEFFICIENTS / PROB > |R| UNDER H0:RHO=0 / NUMBER OF OBSERVATIONS

          MASSDICC    ASDICC    CRDICC    PBDICC      DATE   SO4DICC  MASSDICF    ASDICF    CRDICF    PBDICF   SO4DICF  MASSDICT    ASDICT    CRDICT    PBDICT   SO4DICT

MASSDICC   1.00000   0.02390   0.22387   0.77117   0.16065   0.41843   0.10939   0.12007   0.07425   0.45509   0.17936   0.82446   0.08321   0.14766   0.69221   0.22884
            0.0000    0.9594    0.5341    0.0055    0.6001    0.2288    0.7220    0.7576    0.8385    0.1596    0.6200    0.0005    0.8592    0.6839    0.0207    0.5248
                13         7        10        11        13        10        13         7        10        11        10        13         7        10        11        10

ASDICC     0.02390   1.00000  -0.71803  -0.35040  -0.54277   0.75780   0.32461   0.80981  -0.61608  -0.08786   0.27472   0.13184   0.93504  -0.73415  -0.16740   0.34440
            0.9594    0.0000    0.1080    0.4410    0.2081    0.0869    0.4775    0.0273    0.1928    0.8514    0.5983    0.7781    0.0023    0.0966    0.7193    0.5039
                 7         7         6         7         7         6         7         7         6         7         6         7         7         6         7         6

CRDICC     0.22387  -0.71803   1.00000   0.10348   0.08762  -0.40262   0.43579  -0.47367   0.76069   0.65944  -0.26707   0.39778  -0.60653   0.91922   0.62580  -0.30357
            0.5341    0.1080    0.0000    0.7761    0.8098    0.2827    0.2081    0.3426    0.0106    0.0380    0.4872    0.2550    0.2013    0.0002    0.0529    0.4271
                10         6        10        10        10         9        10         6        10        10         9        10         6        10        10         9
                                                                                                                              Y(5)

PBDICC     0.77117  -0.35040   0.10348   1.00000   0.40322   0.19546  -0.25277  -0.28019   0.10933   0.15152   0.45988   0.48674  -0.32548   0.11368   0.50048   0.47886
            0.0055    0.4410    0.7761    0.0000    0.2188    0.5884    0.4533    0.5428    0.7637    0.6565    0.1811    0.1289    0.4762    0.7545    0.1169    0.1614
                11         7        10        11        11        10        11         7        10        11        10        11         7        10        11        10

DATE       0.16065  -0.54277   0.08762   0.40322   1.00000  -0.22069  -0.55169  -0.55449   0.09279  -0.35479   0.37580  -0.19848  -0.57698   0.09634  -0.16246   0.34141
            0.6001    0.2081    0.8098    0.2188    0.0000    0.5401    0.0506    0.1964    0.7987    0.2843    0.2845    0.5157    0.1750    0.7912    0.6332    0.3343
                13         7        10        11        13        10        13         7        10        11        10        13         7        10        11        10

SO4DICC    0.41843   0.75780  -0.40262   0.19546  -0.22069   1.00000  -0.29320   0.96665  -0.58279  -0.25217   0.08363   0.19671   0.95047  -0.53958  -0.15009   0.18050
            0.2288    0.0809    0.2827    0.5884    0.5401    0.0000    0.4110    0.0016    0.0996    0.4821    0.8183    0.5860    0.0036    0.1338    0.6790    0.6178
                10         6         9        10        10        10        10         6         9        10        10        10         5         9        10        10

MASSDICF   0.10939   0.32461   0.43579  -0.25277  -0.55169  -0.29320   1.00000   0.10261   0.57911   0.79216  -0.02646   0.64843   0.20668   0.55099   0.60087  -0.04877
            0.7220    0.4775    0.2081    0.4533    0.0506    0.4110    0.0000    0.8267    0.0794    0.0037    0.9422    0.0165    0.6566    0.0989    0.0506    0.8936
                13         7        10        11        13        10        13         7        10        11        10        13         7        10        11        10

ASDICF     0.12007   0.80981  -0.47367  -0.28019  -0.55449   0.96665   0.10261   1.00000  -0.72064  -0.18548  -0.21762   0.12135   0.96521  -0.67752  -0.22423  -0.14436
            0.7976    0.0273    0.3426    0.5428    0.1964    0.0016    0.8267    0.0000    0.1062    0.6905    0.6787    0.7955    0.0004    0.1392    0.6288    0.7850
                 7         7         6         7         7         6         7         7         6         7         6         7         7         6         7         6

CRDICF     0.07425  -0.61609   0.76069   0.10933   0.09279  -0.58279   0.57911  -0.72064   1.00000   0.62040   0.30929   0.34878  -0.71148   0.95483   0.59340   0.25000
            0.8385    0.1928    0.0106    0.7637    0.7987    0.0996    0.0794    0.1062    0.0000    0.0557    0.4180    0.3233    0.1129    0.0001    0.0705    0.5165
                10         6        10        10        10         9        10         6        10        10         9        10         5        10        10         9

PBDICF     0.45509  -0.08786   0.65944   0.15152  -0.35479  -0.25217   0.79216  -0.18548   0.62040   1.00000  -0.05140   0.73506  -0.15125   0.67832   0.93158  -0.06551
            0.1596    0.8514    0.0380    0.6565    0.2843    0.4821    0.0037    0.6905    0.0557    0.0000    0.8879    0.0100    0.7462    0.0311    0.0001    0.8573
                11         7        10        11        11        10        11         7        10        11        10        11         7        10        11        10

SO4DICF    0.17936   0.27472  -0.26707   0.45988   0.37580   0.08363  -0.02646  -0.21762   0.30929  -0.05140   1.00000   0.13425  -0.00859   0.06691   0.12689   0.99504
            0.6200    0.5983    0.4872    0.1811    0.2845    0.8183    0.9422    0.6787    0.4180    0.8879    0.0000    0.7116    0.9871    0.8642    0.7269    0.0001
                10         6         9        10        10        10        10         6         9        10        10        10         5         9        10        10

MASSDICT   0.82446   0.13189   0.39778   0.48674  -0.19848   0.19671   0.64843   0.12135   0.34878   0.73506   0.13425   1.00000   0.13209   0.39384   0.82282   0.16373
            0.0005    0.7741    0.2550    0.1289    0.5157    0.5860    0.0165    0.7955    0.3233    0.0100    0.7116    0.0000    0.7777    0.2631    0.0019    0.6513
                13         7        10        11        13        10        13         7        10        11        10        13         7        10        11        10

ASDICT     0.08321   0.93504  -0.60653  -0.32548  -0.57698   0.95047   0.20668   0.96521  -0.71148  -0.15125  -0.00859   0.13209   1.00000  -0.73763  -0.21011   0.06909
            0.8592    0.0023    0.2013    0.4762    0.1750    0.0036    0.6566    0.0004    0.1129    0.7462    0.9871    0.7777    0.0000    0.0942    0.6511    0.8965
                 7         7         6         7         7         6         7         7         6         7         6         7         7         6         7         6

CRDICT     0.14766  -0.73415   0.91922   0.11368   0.09634  -0.53958   0.55099  -0.67752   0.95483   0.67832   0.06691   0.39384  -0.73763   1.00000   0.64653   0.01405
            0.6839    0.0966    0.0002    0.7545    0.7912    0.1338    0.0989    0.1392    0.0001    0.0311    0.8642    0.2601    0.0942    0.0000    0.0434    0.9714
                10         6        10        10        10         9        10         6        10        10         9        10         5        10        10         9

PBDICT     0.69221  -0.16740   0.62580   0.50048  -0.16246  -0.15009   0.60087  -0.22423   0.59340   0.93158   0.12689   0.82282  -0.21011   0.64653   1.00000   0.12150
            0.0207    0.7193    0.0529    0.1169    0.6332    0.6790    0.0506    0.6288    0.0705    0.0001    0.7269    0.0019    0.6511    0.0434    0.0000    0.7381
                11         7        10        11        11        10        11         7        10        11        10        11         7        10        11        10

SO4DICT    0.22884   0.34440  -0.30357   0.47886   0.34141   0.18050  -0.04877  -0.14436   0.25000  -0.06551   0.99504   0.16373   0.06909   0.01405   0.12150   1.00000
            0.5248    0.5039    0.4271    0.1614    0.3343    0.6178    0.8936    0.7850    0.5165    0.8573    0.0001    0.6513    0.8965    0.9714    0.7381    0.0000
                10         6         9        10        10        10        10         6         9        10        10        10         5         9        10        10
                                                                                                                              Y(5)
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                     CORRELATION ANALYSIS OF CIC DATA C VS F VS T BY CITY SEASON                                              680
                                          CITY=HO   SEASON=WINT

                         CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

             MASSDICC     ASDICC     CRDICC     PBDICC       DATE    SO4DICC   MASSDICF     ASDICF     CRDICF     PBDICF    SO4DICF   MASSDICT     ASDICT     CRDICT     PBDICT    SO4DICT

MASSDICC      1.00000   -1.00000   -0.30953    0.30925    0.49814    0.18454   -0.20949   -1.00000    0.07239   -0.19601   -0.24009    0.67896   -1.00000   -0.12152   -0.06190   -0.22892
               0.0000                0.4993     0.4997     0.1428     0.6618     0.5613                0.8774     0.6736     0.5668     0.0309                0.7952     0.8951     0.5855
                   10          2          7          7         10          8         10          2          7          7          8         10          2          7          7          8

ASDICC       -1.00000    1.00000    1.00000   -1.00000   -1.00000   -1.00000   -1.00000    1.00000   -1.00000   -1.00000   -1.00000   -1.00000    1.00000   -1.00000   -1.00000   -1.00000

                    2          2          2          2          2          2          2          2          2          2          2          2          2          2          2          2

CRDICC       -0.30953    1.00000    1.00000   -0.84546   -0.89524   -0.02605   -0.39275    1.00000    0.56155   -0.19020    0.06140   -0.58427   -1.00000    0.86335   -0.45382    0.06508
               0.4993                0.0000     0.0166     0.0064     0.9558     0.3835                0.1896     0.6829     0.8960     0.1683                0.0123     0.3064     0.8857
                    7          2          7          7          7          7          7          2          7          7          7          7       Y(2)          7          7          7

PBDICC        0.30925   -1.00000   -0.84546    1.00000    0.88165    0.53433    0.63161   -1.00000   -0.48665    0.24580   -0.47616    0.75762   -1.00000   -0.73741    0.55464   -0.44669
               0.4997                0.0166     0.0000     0.0087     0.2166     0.1281                0.2681     0.5952     0.2801     0.0485                0.0386     0.1963     0.3150
                    7          2          7          7          7          7          7          2          7          7          7          7          2          7          7          7

DATE          0.49814   -1.00000   -0.89524    0.88165    1.00000    0.42833    0.25854   -1.00000   -0.54914   -0.00391   -0.30378    0.61087   -1.00000   -0.80293    0.29965   -0.24783
               0.1428                0.0064     0.0087     0.0000     0.2897     0.4708                0.2017     0.9934     0.4645     0.0606                0.0297     0.5138     0.5540
                   10          2          7          7         10          8         10          2          7          7          8         10          2          7          7          8

SO4DICC       0.18454   -1.00000   -0.02605    0.53433    0.42833    1.00000    0.66068   -1.00000    0.16886    0.38746   -0.55549    0.64383   -1.00000    0.08921    0.51622   -0.41805
               0.6618                0.9558     0.2166     0.2897     0.0000     0.0745                0.7174     0.3905     0.1529     0.0849                0.8492     0.2356     0.3027
                    8          2          7          7          8          8          8          2          7          7          8          8          2          7          7          8

MASSDICF     -0.20949   -1.00000   -0.39275    0.63161    0.25854    0.66068    1.00000   -1.00000    0.00394    0.76091   -0.25576    0.57565   -1.00000   -0.19923    0.87020   -0.15686
               0.5613                0.3835     0.1281     0.4708     0.0745     0.0000                0.9933     0.0470     0.5410     0.0816                0.6685     0.0109     0.7107
                   10          2          7          7         10          8         10          2          7          7          8         10          2          7          7          8

ASDICF       -1.00000    1.00000    1.00000   -1.00000   -1.00000   -1.00000   -1.00000    1.00000   -1.00000   -1.00000   -1.00000   -1.00000    1.00000   -1.00000   -1.00000   -1.00000

                    2          2          2          2          2          2          2          2          2          2          2          2          2          2          2          2

CRDICF        0.07239   -1.00000    0.56155   -0.48665   -0.54914    0.16886    0.00394   -1.00000    1.00000    0.53373    0.25568    0.07204   -1.00000    0.90233    0.29097    0.30748
               0.8774                0.1896     0.2681     0.2017     0.7174     0.9933                0.0000     0.2173     0.5800     0.8780                0.0054     0.5267     0.5023
                    7          2          7          7          7          7          7          2          7          7          7          7          2          7          7          7

PBDICF       -0.19601   -1.00000   -0.19020    0.24580   -0.00391    0.38746    0.76091   -1.00000    0.53373    1.00000    0.17058    0.36348   -1.00000    0.22908    0.94289    0.24700
               0.6736                0.6829     0.5952     0.9934     0.3905     0.0470                0.2173     0.0000     0.7146     0.4229                0.6212     0.0015     0.5933
                    7          2          7          7          7          7          7          2          7          7          7          7          2          7          7          7

SO4DICF      -0.24009   -1.00000    0.06140   -0.47616   -0.30378   -0.55549   -0.25576   -1.00000    0.25568    0.17058    1.00000   -0.40762   -1.00000    0.18949   -0.01723    0.98751
               0.5668                0.8960     0.2801     0.4645     0.1529     0.5410                0.5800     0.7146     0.0000     0.3162                0.6841     0.9708     0.0001
                    8          2          7          7          8          8          8          2          7          7          8          8          2          7          7          8

MASSDICT      0.67896   -1.00000   -0.58427    0.75762    0.61087    0.64383    0.57565   -1.00000    0.07204    0.36348   -0.40762    1.00000   -1.00000   -0.26255    0.57243   -0.32669
               0.0309                0.1683     0.0485     0.0606     0.0849     0.0816                0.8780     0.4229     0.3162     0.0000                0.5695     0.1793     0.4296
                   10          2          7          7         10          8         10          2          7          7          8         10          2          7          7          8

ASDICT       -1.00000    1.00000    1.00000   -1.00000   -1.00000   -1.00000   -1.00000    1.00000   -1.00000   -1.00000   -1.00000   -1.00000    1.00000   -1.00000   -1.00000   -1.00000

                    2          2          2          2          2          2          2          2          2          2          2          2          2          2          2          2

CRDICT       -0.12152   -1.00000    0.86335   -0.73741   -0.80293    0.08921   -0.19923   -1.00000    0.90233    0.22908    0.18949   -0.26255   -1.00000    1.00000   -0.05674    0.22316
               0.7952                0.0123     0.0386     0.0297     0.8492     0.6685                0.0054     0.6212     0.6841     0.5695                0.0000     0.9038     0.6305
                    7          2          7          7          7          7          7          2          7          7          7          7          2          7          7          7

PBDICT       -0.06190   -1.00000   -0.45382    0.55464    0.29965    0.51622    0.87020   -1.00000    0.29097    0.94289   -0.01723    0.57243   -1.00000   -0.05674    1.00000    0.05850
               0.8951                0.3064     0.1963     0.5138     0.2356     0.0109                0.5267     0.0015     0.9708     0.1793                0.9038     0.0000     0.9009
                    7          2          7          7          7          7          7          2          7          7          7          7          2          7          7          7

SO4DICT      -0.22892   -1.00000    0.06508   -0.44669   -0.24783   -0.41805   -0.15686   -1.00000    0.30748    0.24700    0.98751   -0.32669   -1.00000    0.22316    0.05850    1.00000
               0.5855                0.8857     0.3150     0.5540     0.3027     0.7107                0.5023     0.5933     0.0001     0.4296                0.6305     0.9009     0.0000
                    8          2          7          7          8          8          8          2          7          7          8          8        YC2          7          7          8
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                          CORRELATION ANALYSIS OF DIC DATA COARSE VS FINE VS TOTAL BY CITY
                                                        CITY=DC

                          CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

            MASSDICC    ASDICC    CRDICC    PBDICC      DATE   SO4DICC  MASSDICF    ASDICF    CRDICF    PBDICF   SO4DICF  MASSDICT    ASDICT    CRDICT    PBDICT   SO4DICT

MASSDICC     1.00000   0.23616   0.39989   0.80580   0.26272   0.55698   0.61016   0.64040  -0.07630   0.83395   0.17155   0.90672   0.70087   0.15718   0.83207   0.37541
              0.0000    0.6102    0.1117    0.0001    0.2922    0.0310    0.0072    0.1213    0.7710    0.0001    0.5410    0.0001    0.0794    0.5469    0.0001    0.1679
                  18         7        17        17        18        15        18         7        17        17        15        18         7        17        17        15

ASDICC       0.23616   1.00000  -0.05232   0.41331   0.26635   0.90433   0.53926  -0.11080  -0.02157   0.39820  -0.41275   0.37822   0.18054  -0.04855   0.40268  -0.02571
              0.6102    0.0000    0.9113    0.3567    0.5637    0.0350    0.2116    0.8131    0.9634    0.3763    0.4898    0.4028    0.6985    0.9177    0.3704    0.9673
                   7         7         7         7         7         5         7         7         7         7         5         7         7         7         7         5

CRDICC       0.39989  -0.05232   1.00000   0.21042   0.42087  -0.27962   0.27912   0.70339   0.60831   0.31791   0.29297   0.38863   0.68538   0.87590   0.29534   0.16602
              0.1117    0.9113    0.0000    0.4176    0.0925    0.3128    0.2780    0.0778    0.0096    0.2137    0.2893    0.1232    0.0892    0.0001    0.2495    0.5543
                  17         7        17        17        17        15        17         7        17        17        15        17      Y(7)        17        17        15

PBDICC       0.80580   0.41331   0.21042   1.00000   0.18983   0.61516   0.59315   0.51523  -0.22468   0.96936   0.08756   0.79825   0.62878  -0.02955   0.98148   0.32074
              0.0001    0.3567    0.4176    0.0000    0.4655    0.0147    0.0121    0.2366    0.3860    0.0001    0.7563    0.0001    0.1304    0.9104    0.0001    0.2438
                  17         7        17        17        17        15        17         7        17        17        15        17         7        17        17        15

DATE         0.26272   0.26635   0.42087   0.18983   1.00000  -0.13078   0.52699   0.91730   0.75835   0.28765   0.62628   0.43305   0.98567   0.67465   0.26713   0.56650
              0.2922    0.5637    0.0925    0.4655    0.0000    0.6422    0.0246    0.0036    0.0004    0.2629    0.0125    0.0726    0.0001    0.0030    0.3000    0.0277
                  18         7        17        17        18        15        18         7        17        17        15        18         7        17        17        15

SO4DICC      0.55698   0.90433  -0.27962   0.61516  -0.13078   1.00000   0.27329  -0.36057  -0.34121   0.48339  -0.15872   0.46682  -0.08307  -0.34433   0.51720   0.23398
              0.0310    0.0350    0.3128    0.0147    0.6422    0.0000    0.3243    0.5511    0.2133    0.0679    0.5721    0.0794    0.8944    0.2088    0.0483    0.4013
                  15         5        15        15        15        15        15         5        15        15        15        15         5        15        15        15

MASSDICF     0.61016   0.53926   0.27912   0.59315   0.52699   0.27329   1.00000   0.65165   0.31079   0.64774   0.62389   0.88736   0.79715   0.33348   0.63888   0.71549
              0.0072    0.2116    0.2780    0.0121    0.0246    0.3243    0.0000    0.1128    0.2247    0.0049    0.0129    0.0001    0.0318    0.1909    0.0058    0.0027
                  18         7        17        17        18        15        18         7        17        17        15        18         7        17        17        15

ASDICF       0.64040  -0.11080   0.70339   0.51523   0.91730  -0.36057   0.65165   1.00000   0.79102   0.57289   0.82749   0.70056   0.95741   0.98524   0.56200   0.70167
              0.1213    0.8131    0.0778    0.2366    0.0036    0.5511    0.1128    0.0000    0.0341    0.1788    0.0837    0.0796    0.0007    0.0001    0.1892    0.1866
                   7         7         7         7         7         5         7         7         7         7         5         7         7         7         7         5

CRDICF      -0.07630  -0.02157   0.60831  -0.22468   0.75835  -0.34121   0.31079   0.79102   1.00000  -0.11826   0.57981   0.11549   0.77437   0.91574  -0.14291   0.43819
              0.7710    0.9634    0.0096    0.3860    0.0004    0.2133    0.2247    0.0341    0.0000    0.6512    0.0235    0.6589    0.0410    0.0001    0.5843    0.1023
                  17         7        17        17        17        15        17         7        17        17        15        17         7        17        17        15

PBDICF       0.83395   0.39820   0.31791   0.96936   0.28765   0.48339   0.64774   0.57289  -0.11826   1.00000   0.25323   0.84393   0.68367   0.08957   0.99846   0.43054
              0.0001    0.3763    0.2137    0.0001    0.2629    0.0679    0.0049    0.1788    0.6512    0.0000    0.3625    0.0001    0.0904    0.7325    0.0001    0.1091
                  17         7        17        17        17        15        17         7        17        17        15        17         7        17        17        15

SO4DICF      0.17155  -0.41275   0.29297   0.08756   0.62628  -0.15872   0.62389   0.82749   0.57981   0.25323   1.00000   0.46323   0.70739   0.49931   0.21844   0.92236
              0.5410    0.4898    0.2893    0.7563    0.0125    0.5721    0.0129    0.0837    0.0235    0.3625    0.0000    0.0820    0.1814    0.0581    0.4341    0.0001
                  15         5        15        15        15        15        15         5        15        15        15        15         5        15        15        15

MASSDICT     0.90672   0.37822   0.38863   0.79825   0.43305   0.46682   0.88736   0.70056   0.11549   0.84393   0.46323   1.00000   0.80041   0.26932   0.83814   0.62905
              0.0001    0.4028    0.1232    0.0001    0.0726    0.0794    0.0001    0.0796    0.6589    0.0001    0.0820    0.0000    0.0306    0.2959    0.0001    0.0120
                  18         7        17        17        18        15        18         7        17        17        15        18         7        17        17        15

ASDICT       0.70087   0.18054   0.68538   0.62878   0.98567  -0.08307   0.79715   0.95741   0.77437   0.68367   0.70739   0.80041   1.00000   0.96206   0.67372   0.70040
              0.0794    0.6985    0.0892    0.1304    0.0001    0.8944    0.0318    0.0007    0.0410    0.0904    0.1814    0.0306    0.0000    0.0005    0.0970    0.1978
                   7         7         7         7         7         5         7         7         7         7         5         7         7         7         7         5

CRDICT       0.15718  -0.04855   0.87590  -0.02955   0.67465  -0.34433   0.33348   0.98524   0.91574   0.08957   0.49931   0.26932   0.96206   1.00000   0.06316   0.35098
              0.5469    0.9177    0.0001    0.9104    0.0030    0.2088    0.1909    0.0001    0.0001    0.7325    0.0581    0.2959    0.0005    0.0000    0.8097    0.1996
                  17         7        17        17        17        15        17         7        17        17        15        17         7        17        17        15

PBDICT       0.83207   0.40268   0.29534   0.98148   0.26713   0.51720   0.63888   0.56200  -0.14291   0.99846   0.21844   0.83814   0.67372   0.06316   1.00000   0.40995
              0.0001    0.3704    0.2495    0.0001    0.3000    0.0483    0.0058    0.1892    0.5843    0.0001    0.4341    0.0001    0.0970    0.8097    0.0000    0.1292
                  17         7        17        17        17        15        17         7        17        17        15        17         7        17        17        15

SO4DICT      0.37541  -0.02571   0.16602   0.32074   0.56650   0.23398   0.71549   0.70167   0.43819   0.43054   0.92236   0.62905   0.70040   0.35098   0.40995   1.00000
              0.1679    0.9673    0.5543    0.2438    0.0277    0.4013    0.0027    0.1866    0.1023    0.1091    0.0001    0.0120 [illegible] [illegible] [illegible] [illegible]
                  15         5        15        15        15        15        15         5        15 [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]
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                     CORRELATION ANALYSIS OF DIC DATA COARSE VS FINE VS TOTAL BY CITY                              636
                                                CITY=UT

              CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

            MASSDICC    ASDICC    CRDICC    PBDICC      DATE   SO4DICC  MASSDICF    ASDICF    CRDICF    PBDICF   SO4DICF  MASSDICT    ASDICT    CRDICT    PBDICT   SO4DICT

MASSDICC     1.00000   0.01479   0.10875   0.07244   0.08085  -0.02391   0.44558   0.22854   0.36705   0.05850  -0.05462   0.80405   0.19823   0.27230   0.09190  -0.05119
              0.0000    0.9566    0.5744    0.7088    0.6600    0.9039    0.0106    0.3946    0.0501    0.7631    0.7825    0.0001    0.4618    0.1530    0.6354    0.7939
                  32        16        29        29        32        28        32        16        29        29        28        32        15        29        29        28

ASDICC       0.01479   1.00000   0.18518  -0.04135  -0.59363  -0.03970  -0.26150   0.10131  -0.04582  -0.28075  -0.42318  -0.23291   0.54587   0.17096  -0.25060  -0.40007
              0.9566    0.0000    0.4923    0.8791    0.0153    0.8883    0.3279    0.7089    0.8662    0.2922    0.1160    0.3853    0.0287    0.5267    0.3492    0.1395
                  16        16        16        16        16        15        16        16        16        16        15        16        16        16        16        15

CRDICC       0.10875   0.18518   1.00000  -0.38293  -0.01588  -0.10337  -0.17791   0.51018   0.37259  -0.29660  -0.00006  -0.06946   0.51370   0.77865  -0.40169  -0.01707
              0.5744    0.4923    0.0000    0.0403    0.9348    0.6007    0.3558    0.0435    0.0465    0.1182    0.9998    0.7203    0.0418    0.0001    0.0308    0.9313
                  29        16        29        29        29        28        29        16        29        29        28        29    Y (16)        29        29        28

PBDICC       0.07244  -0.04135  -0.38293   1.00000  -0.08473   0.28835   0.01218  -0.33170  -0.01511   0.15969  -0.17049   0.05519  -0.29835  -0.20696   0.57840  -0.11199
              0.7088    0.8791    0.0403    0.0000    0.6621    0.1367    0.9500    0.2094    0.9380    0.4080    0.3857    0.7761    0.2617    0.2816    0.0010    0.5705
                  29        16        29        29        29        28        29        16        29        29        28        29        15        29        29        28

DATE         0.08085  -0.59363  -0.01588  -0.08473   1.00000   0.45584   0.50678   0.36021  -0.19650   0.15719   0.74887   0.37703   0.03105  -0.11941   0.07886   0.76447
              0.6600    0.0153    0.9348    0.6621    0.0000    0.0149    0.0031    0.1705    0.3070    0.4154    0.0001    0.0334    0.9091    0.5372    0.6843    0.0001
                  32        16        29        29        32        28        32        16        29        29        28        32        16        29        29        28

SO4DICC     -0.02391  -0.03970  -0.10337   0.28835   0.45584   1.00000   0.52900  -0.09070  -0.25307  -0.00586   0.41941   0.39087  -0.09275  -0.18081   0.09025   0.55473
              0.9039    0.8883    0.6007    0.1367    0.0148    0.0000    0.0038    0.7479    0.1938    0.9764    0.0263    0.0397    0.7423    0.3572    0.6479    0.0022
                  28        15        28        28        28        28        28        15        28        28        28        28        15        28        28        28

MASSDICF     0.44558  -0.26150  -0.17791   0.01218   0.50678   0.52900   1.00000   0.25902  -0.22266   0.34938   0.67868   0.89053   0.09940  -0.13819   0.27120   0.71472
              0.0106    0.3279    0.3558    0.9500    0.0031    0.0038    0.0000    0.3327    0.2457    0.0632    0.0001    0.0001    0.7142    0.4747    0.1547    0.0001
                  32        16        29        29        32        28        32        16        29        29        28        32        15        29        29        28

ASDICF       0.22854   0.10131   0.51018  -0.33170   0.36021  -0.09070   0.25902   1.00000   0.26316  -0.08457   0.48229   0.34050   0.88685   0.51429  -0.25160   0.43779
              0.3946    0.7089    0.0435    0.2094    0.1705    0.7479    0.3327    0.0000    0.3247    0.7555    0.0687    0.1969    0.0001    0.0415    0.3472    0.1027
                  16        16        16        16        16        15        16        16        16        16        15        16        16        16        16        15

CRDICF       0.36705  -0.04582   0.37259  -0.01511  -0.19650  -0.25307  -0.22266   0.26316   1.00000   0.02128  -0.23807   0.05552   0.19995   0.69125   0.01801  -0.25759
              0.0501    0.8662    0.0465    0.9380    0.3070    0.1938    0.2457    0.3247    0.0000    0.9128    0.2225    0.7749    0.4578    0.0001    0.9261    0.1957
                  29        16        29        29        29        28        29        16        29        29        28        29        15        29        29        28

PBDICF       0.05850  -0.28075  -0.29660   0.15969   0.15719  -0.00586   0.34938  -0.08457   0.02128   1.00000  -0.07194   0.30205  -0.20011  -0.03706   0.89560  -0.06779
              0.7631    0.2922    0.1182    0.4080    0.4154    0.9764    0.0632    0.7555    0.9128    0.0000    0.7160    0.1113    0.4574    0.6165    0.0001    0.7318
                  29        16        29        29        29        28        29        16        29        29        28        29        15        29        29        28

SO4DICF     -0.05462  -0.42318  -0.00006  -0.17049   0.74887   0.41941   0.67868   0.48229  -0.23807  -0.07194   1.00000   0.48345   0.21677  -0.14511  -0.15323   0.98787
              0.7825    0.1160    0.9998    0.3857    0.0001    0.0263    0.0001    0.0687    0.2225    0.7160    0.0000    0.0092    0.4377    0.4613    0.4363    0.0001
                  28        15        28        28        28        28        28        15        28        28        28        28        15        28        28        28

MASSDICT     0.80405  -0.23291  -0.06946   0.05519   0.37703   0.39087   0.89053   0.34050   0.05552   0.30205   0.48345   1.00000   0.18063   0.06057   0.26369   0.51352
              0.0001    0.3853    0.7203    0.7761    0.0334    0.0397    0.0001    0.1969    0.7749    0.1113    0.0092    0.0000    0.5033    0.7549    0.1669    0.0052
                  32        16        29        29        32        28        32        16        29        29        28        32        15        29        29        28

ASDICT       0.19823   0.54587   0.51370  -0.29835   0.03106  -0.09276   0.09940   0.88686   0.19995  -0.20011   0.21677   0.18060   1.00000   0.51112  -0.32718   0.18990
              0.4618    0.0287    0.0418    0.2617    0.9091    0.7423    0.7142    0.0001    0.4578    0.4574    0.4377    0.5033    0.0000    0.0430    0.2161    0.4978
                  16        16        16        16        16        15        16        16        16        16        15        16        15        16        16        15

CRDICT       0.27230   0.17096   0.77865  -0.20686  -0.11941  -0.18061  -0.13819   0.51429   0.69125  -0.09706  -0.14511   0.06057   0.51112   1.00000  -0.16168  -0.16046
              0.1530    0.5267    0.0001    0.2816    0.5372    0.3572    0.4747    0.0415    0.0001    0.6165    0.4613    0.7549    0.0433    0.0000    0.4021    0.4147
                  29        16        29        29        29        28        29        16        29        29        28        29        15        29        29        28

PBDICT       0.09190  -0.25060  -0.40169   0.57840   0.07886   0.09025   0.27120  -0.25160   0.01801   0.89560  -0.15323   0.26368  -0.32718  -0.16168   1.00000  -0.12814
              0.6354    0.3492    0.0308    0.0010    0.6843    0.6479    0.1547    0.3472    0.9261    0.0001    0.4363    0.1669    0.2161    0.4021    0.0000    0.5158
                  29        16        29        29        29        28        29        16        29        29        28        29        15        29        29        28

SO4DICT     -0.05118  -0.40007  -0.01707  -0.11199   0.76447   0.55473   0.71472   0.43779  -0.25759  -0.06779   0.98787   0.51352   0.18990  -0.16046  -0.12814   1.00000
              0.7959    0.1395    0.9313    0.5705    0.0001    0.0022    0.0001    0.1027    0.1857    0.7318    0.0001    0.0052    0.4978    0.4147    0.5158    0.0000
                  28        15        28        28        28        28        28        15        28        28        28        28     YC 15        28        28        28
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                          CORRELATION ANALYSIS OF CIC DATA C VS F VS T BY CITY SEASON
                                        CITY=CT   SEASON=FALL

                  CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

          MASSDICC   ASDICC   CRDICC   PBDICC     DATE  SO4DICC MASSDICF   ASDICF   CRDICF   PBDICF  SO4DICF MASSDICT   ASDICT    CRDICT   PBDICT  SO4DICT

MASSDICC   1.00000 -0.04962  0.02786  0.10276  0.19117 -0.03390  0.29069  0.41246  0.42885  0.21600 -0.05353  0.83536  0.20754   0.26210  0.22580 -0.04797
            0.0000   0.8721   0.9046   0.6576   0.4197   0.8872   0.1894   0.1613   0.0524   0.3470   0.8227   0.0001   0.4963    0.2511   0.3250   0.8412
                22       13       21       21       22       20       22       13       21       21       20       22       13        21       21       20

ASDICC    -0.04962  1.00000  0.18936 -0.10792 -0.68572  0.23015 -0.02937  0.43176 -0.16079 -0.31563 -0.38006 -0.04547  0.85442   0.12241 -0.33807 -0.27029
            0.8721   0.0000   0.5355   0.7256   0.0097   0.4718   0.9241   0.1407   0.5997   0.2935   0.2230   0.8827   0.0002    0.6903   0.2586   0.3955
                13       13       13       13       13       12       13       13       13       13       12       13       13        13       13       12

CRDICC     0.02756  0.18936  1.00000 -0.38043  0.30819  0.11804 -0.04059  0.64449  0.28893 -0.12457 -0.00250 -0.00892  0.48596   0.76266 -0.28443  0.02548
            0.9046   0.5355   0.0000   0.0889   0.1741   0.6202   0.8613   0.0174   0.2040   0.5906   0.9916   0.9694   0.0922    0.0001   0.2114   0.9151
                21       13       21       21       21       20       21       13       21       21       20       21       13  Y(13) 21       21       20

PBDICC     0.10276 -0.10792 -0.38043  1.00000  0.00540  0.46301  0.08255 -0.35332 -0.04359  0.13036 -0.08062  0.12413 -0.26890  -0.23247  0.58647  0.00868
            0.6576   0.7256   0.0889   0.0000   0.9815   0.0398   0.7220   0.2363   0.8512   0.5733   0.7355   0.5919   0.3743    0.3105   0.0052   0.9710
                21       13       21       21       21       20       21       13       21       21       20       21       13        21       21       20

DATE       0.19117 -0.68572  0.30819  0.00540  1.00000  0.23889  0.40629 -0.01253  0.47172  0.17700  0.44332  0.35202 -0.42256   0.48690  0.14714  0.46847
            0.4197   0.0097   0.1741   0.9815   0.0000   0.3104   0.0606   0.9676   0.0309   0.4428   0.0503   0.1081   0.1503    0.0252   0.5245   0.0372
                22       13       21       21       22       20       22       13       21       21       20       22       13        21       21       20

SO4DICC   -0.03390  0.23015  0.11804  0.46301  0.23889  1.00000  0.23433 -0.02128 -0.09455 -0.14630  0.22515  0.13520  0.12613   0.06271  0.10252  0.41523
            0.8872   0.4718   0.6202   0.0398   0.3104   0.0000   0.3200   0.9477   0.6917   0.5382   0.3399   0.5698   0.6961    0.7928   0.6671   0.0687
                20       12       20       20       20       20       20       12       20       20       20       20       12        20       20       20

MASSDICF   0.29069 -0.02937 -0.04059  0.08255  0.40629  0.23433  1.00000  0.34243  0.12308  0.38756  0.37329  0.76874  0.17947   0.22070  0.35620  0.40434
            0.1894   0.9241   0.8613   0.7220   0.0506   0.3200   0.0000   0.2521   0.5951   0.0826   0.1050   0.0001   0.5574    0.3364   0.1130   0.0770
                22       13       21       21       22       20       22       13       21       21       20       22       13        21       21       20

ASDICF     0.41246  0.43176  0.64449 -0.35332 -0.01253 -0.02128  0.34243  1.00000  0.36725  0.45981 -0.24696  0.47824  0.83757   0.65916  0.19069 -0.21658
            0.1613   0.1407   0.0174   0.2363   0.9676   0.9477   0.2521   0.0000   0.2170   0.1139   0.4390   0.0983   0.0004    0.0143   0.5326   0.4990
                13       13       13       13       13       12       13       13       13       13       12       13       13        13       13       12

CRDICF     0.42885 -0.16079  0.28893 -0.04359  0.47172 -0.09455  0.12308  0.36725  1.00000  0.25309  0.02106  0.36494  0.11416   0.57612  0.18582  0.00742
            0.0524   0.5997   0.2040   0.8512   0.0309   0.6917   0.5951   0.2170   0.0000   0.2683   0.9298   0.1038   0.7104    0.0063   0.4200   0.9752
                21       13       21       21       21       20       21       13       21       21       20       21       13        21       21       20

PBDICF     0.21600 -0.31563 -0.12457  0.13036  0.17700 -0.14630  0.38756  0.45981  0.25309  1.00000 -0.10178  0.39684  0.07370   0.15463  0.87951 -0.12736
            0.3470   0.2935   0.5906   0.5733   0.4428   0.5382   0.0826   0.1139   0.2683   0.0000   0.6694   0.0749   0.8109    0.5033   0.0001   0.5926
                21       13       21       21       21       20       21       13       21       21       20       21       13        21       21       20

SO4DICF   -0.05353 -0.38006 -0.00250 -0.08062  0.44332  0.22515  0.37329 -0.24696  0.02106 -0.10178  1.00000  0.20711 -0.37342   0.00518 -0.12184  0.97949
            0.8227   0.2230   0.9916   0.7355   0.0503   0.3399   0.1050   0.4390   0.9298   0.6694   0.0000   0.3809   0.2318    0.9827   0.6089   0.0001
                20       12       20       20       20       20       20       12       20       20       20       20       12        20       20       20

MASSDICT   0.83536 -0.04547 -0.00892  0.12413  0.35202  0.13520  0.76874  0.47824  0.36494  0.39684  0.20711  1.00000  0.24794   0.31639  0.38377  0.23238
            0.0001   0.8827   0.9694   0.5919   0.1081   0.5698   0.0001   0.0983   0.1038   0.0749   0.3809   0.0000   0.4141    0.1623   0.0859   0.3242
                22       13       21       21       22       20       22       13       21       21       20       22       13        21       21       20

ASDICT     0.20754  0.85442  0.48596 -0.26890 -0.42256  0.12613  0.17947  0.83757  0.11416  0.07370 -0.37342  0.24794  1.00000   0.45386 -0.09493 -0.28954
            0.4963   0.0002   0.0922   0.3743   0.1503   0.6961   0.5574   0.0004   0.7104   0.8109   0.2318   0.4141   0.0000    0.1193   0.7577   0.3613
                13       13       13       13       13       12       13       13       13       13       12       13       13        13       13       12

CRDICT     0.26210  0.12241  0.76266 -0.23247  0.48690  0.06271  0.22070  0.65916  0.57612  0.15463  0.00518  0.31639  0.45386   1.00000  0.01463  0.02565
            0.2511   0.6903   0.0001   0.3105   0.0252   0.7928   0.3364   0.0143   0.0063   0.5033   0.9827   0.1623   0.1193    0.0000   0.9498   0.9145
                21       13       21       21       21       20       21       13       21       21       20       21       13        21       21       20

PBDICT     0.22580 -0.33807 -0.28443  0.58647  0.14714  0.10252  0.35620  0.19069  0.18582  0.87951 -0.12184  0.38377 -0.09493   0.01463  1.00000 -0.09991
            0.3250   0.2586   0.2114   0.0052   0.5245   0.6671   0.1130   0.5326   0.4200   0.0001   0.6089   0.0859   0.7577    0.9498   0.0000   0.6751
                21       13       21       21       21       20       21       13       21       21       20       21       13        21       21       20

SO4DICT   -0.04797 -0.27029  0.02548  0.00868  0.46847  0.41523  0.40434 -0.21658  0.00742 -0.12736  0.97949  0.23238 -0.28954   0.02565 -0.09991  1.00000
            0.8412   0.3955   0.9151   0.9710   0.0372   0.0687   0.0770   0.4990   0.9752   0.5926   0.0001   0.3242   0.3613    0.9145   0.6751   0.0000
                20       12       20       20       20       20       20       12       20       20       20       20       12  Y(12) 20       20       20
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                 CORRELATION ANALYSIS OF DIC DATA C VS F VS T BY CITY SEASON
                                CITY=CT   SEASON=WINT

           CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

          MASSDICC    ASDICC    CRDICC    PBDICC      DATE   SO4DICC  MASSDICF    ASDICF    CRDICF    PBDICF   SO4DICF  MASSDICT    ASDICT     CRDICT    PBDICT   SO4DICT

MASSDICC   1.00000   0.35921   0.29382  -0.16955   0.33463   0.06459   0.74318   0.49344   0.22861  -0.42933   0.08059   0.90758   0.48713    0.30133  -0.36965   0.08717
            0.0000    0.7661    0.4800    0.6881    0.3446    0.8792    0.0138    0.6715    0.5861    0.2885    0.8495    0.0003    0.6761     0.4683    0.3674    0.8374
                10         3         8         8        10         8        10         3         8         8         8        10         3          8         8         8

ASDICC     0.35921   1.00000   0.56283  -0.47032   0.03394  -0.40763  -0.92750   0.98898   0.98235  -0.95555   0.82425  -0.94348   0.99002    0.94768  -0.93668   0.98783
            0.7661    0.0000    0.6194    0.6883    0.9784    0.7327    0.2439    0.0946    0.1198    0.1905    0.3832    0.2151    0.0900     0.2069    0.2278    0.0994
                 3         3         3         3         3         3         3         3         3         3         3         3         3          3         3         3

CRDICC     0.29382   0.56283   1.00000  -0.89663   0.28623  -0.23076  -0.12380   0.67901   0.46074  -0.86430   0.56803   0.11304  -0.67365    0.83412  -0.88355   0.46991
            0.4800    0.6194    0.0000    0.0026    0.4919    0.5824    0.7702    0.5248    0.2506    0.0056    0.1419    0.7899    0.5294     0.0100    0.0036    0.2400
                 8         3         8         8         8         8         8         3         8         8         8         8         3          8         8         8

PBDICC    -0.16955  -0.47032  -0.89663   1.00000  -0.22702   0.46082   0.12987  -0.59581  -0.39008   0.70127  -0.60545  -0.02394  -0.58998   -0.73476   0.75388  -0.45194
            0.6881    0.6883    0.0026    0.0000    0.5887    0.2505    0.7592    0.5937    0.3394    0.0526    0.1117    0.9551    0.5983     0.0379    0.0307    0.2609
                 8         3         8         8         8         8         8         3         8         8         8         8         3          8         8         8

DATE       0.33463   0.03394   0.28623  -0.22702   1.00000   0.31251   0.05829   0.18155   0.22035  -0.35612   0.49714   0.18395   0.17443    0.29330  -0.35204   0.52841
            0.3446    0.9784    0.4919    0.5887    0.0000    0.4511    0.8729    0.8838    0.6000    0.3866    0.2101    0.6109    0.8884     0.4808    0.3924    0.1782
                10         3         8         8        10         8        10         3         8         8         8        10         3          8         8         8

SO4DICC    0.06459  -0.40763  -0.23076   0.46082   0.31251   1.00000   0.63311  -0.53835  -0.07733   0.04635   0.22276   0.49788  -0.53223   -0.17604   0.04835   0.43382
            0.8792    0.7327    0.5824    0.2505    0.4511    0.0000    0.0920    0.6381    0.8556    0.9132    0.5959    0.2093    0.6427     0.6767    0.9095    0.2829
                 8         3         8         8         8         8         8         3         8         8         8         8         3          8         8         8

MASSDICF   0.74318  -0.92750  -0.12380   0.12987   0.05829   0.63311   1.00000  -0.97262  -0.02574   0.16078   0.62353   0.95543  -0.97092   -0.08320   0.08749   0.72177
            0.0138    0.2439    0.7702    0.7592    0.8729    0.0920    0.0000    0.1493    0.9518    0.7037    0.0986    0.0001    0.1539     0.8447    0.8368    0.0432
                10         3         8         8        10         8        10         3         8         8         8        10         3          8         8         8

ASDICF     0.49344   0.98898   0.67901  -0.59581   0.18155  -0.53835  -0.97262   1.00000   0.94383  -0.98867   0.89901  -0.88400   0.99997    0.98450  -0.97821   0.99997
            0.6715    0.0946    0.5248    0.5937    0.8838    0.6381    0.1493    0.0000    0.2144    0.0959    0.2886    0.3097    0.0046     0.1122    0.1332    0.0048
                 3         3         3         3         3         3         3         3         3         3         3         3         3          3         3         3

CRDICF     0.22861   0.98235   0.46074  -0.39008   0.22035  -0.07733  -0.02574   0.94383   1.00000  -0.76986   0.54461   0.13870   0.94619    0.87384  -0.77485   0.48901
            0.5861    0.1198    0.2506    0.3394    0.6000    0.8556    0.9518    0.2144    0.0000    0.0255    0.1628    0.7433    0.2098     0.0046    0.0239    0.2188
                 8         3         8         8         8         8         8         3         8         8         8         8         3          8         8         8

PBDICF    -0.42933  -0.95555  -0.86430   0.70127  -0.35612   0.04635   0.16078  -0.98867  -0.76986   1.00000  -0.55397  -0.18024  -0.98756   -0.95120   0.99052  -0.50047
            0.2885    0.1905    0.0056    0.0526    0.3866    0.9132    0.7037    0.0959    0.0255    0.0000    0.1542    0.6693    0.1005     0.0003    0.0001    0.2065
                 8         3         8         8         8         8         8         3         8         8         8         8         3          8         8         8

SO4DICF    0.08059   0.82425   0.56803  -0.60545   0.49714   0.22276   0.62353   0.89901   0.54461  -0.55397   1.00000   0.50221   0.89581    0.65097  -0.64051   0.97495
            0.8495    0.3832    0.1419    0.1117    0.2101    0.5959    0.0986    0.2886    0.1628    0.1542    0.0000    0.2047    0.2932     0.0804    0.0871    0.0001
                 8         3         8         8         8         8         8         3         8         8         8         8         3          8         8         8

MASSDICT   0.90758  -0.94348   0.11304  -0.02394   0.18395   0.49788   0.95543  -0.88400   0.13870  -0.18024   0.50221   1.00000  -0.88737    0.14739  -0.19163   0.57708
            0.0003    0.2151    0.7899    0.9551    0.6109    0.2093    0.0001    0.3097    0.7433    0.6693    0.2047    0.0000    0.3051     0.7276    0.6494    0.1342
                10         3         8         8        10         8        10         3         8         8         8        10         3          8         8         8

ASDICT     0.43713   0.99002   0.67368  -0.58998   0.17443  -0.53223  -0.97092   0.99957   0.94619  -0.98756   0.89581  -0.88737   1.00000    0.94320  -0.97668   0.99989
            0.5761    0.0900    0.5294    0.5983    0.8864    0.6427    0.1539    0.0046    0.2098    0.1005    0.2932    0.3051    0.0000     0.1169    0.1378    0.0094
                 3         3         3         3         3         3         3         3         3         3         3         3         3          3         3         3

CRDICT     0.30133   0.94768   0.83412  -0.73476   0.29330  -0.17604  -0.08320   0.98450   0.87384  -0.95120   0.65097   0.14739   0.98323    1.00000  -0.96501   0.56219
            0.4683    0.2069    0.0100    0.0379    0.4808    0.6767    0.8447    0.1122    0.0046    0.0003    0.0804    0.7276    0.1169     0.0000    0.0001    0.1469
                 8         3         8         8         8         8         8         3         8         8         8         8         3          8         8         8

PBDICT    -0.36965  -0.93668  -0.88355   0.75388  -0.35204   0.04835   0.08749  -0.97821  -0.77485   0.99052  -0.64051  -0.19163  -0.97668   -0.96501   1.00000  -0.58041
            0.3674    0.2278    0.0036    0.0307    0.3974    0.9095    0.8368    0.1332    0.0239    0.0001    0.0871    0.6494    0.1373     0.0001    0.0000    0.1314
                 8         3         8         8         8         8         8         3         8         8         8         8         3          8         8         8

SO4DICT    0.08717   0.98783   0.46991  -0.45194   0.52841   0.43382   0.72177   0.99997   0.48901  -0.50047   0.97495   0.57708   0.99989    0.56219  -0.58041   1.00000
            0.8374    0.0994    0.2400    0.2609    0.1782    0.2829    0.0432    0.0048    0.2188    0.2065    0.0001    0.1342    0.0094     0.1469    0.1314    0.0000
                 8         3         8         8         8         8         8         3         8         8         8         8         3          8         8         8
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                    CORRELATION ANALYSIS OF DIC DATA COARSE VS FINE VS TOTAL BY CITY
                                             CITY=TC

                  CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

           MASSDICC    ASDICC    CRDICC    PBDICC      DATE   SO4DICC  MASSDICF    ASDICF    CRDICF    PBDICF   SO4DICF  MASSDICT    ASDICT    CRDICT    PBDICT   SO4DICT

MASSDICC    1.00000   0.34138   0.65764   0.11925   0.38645   0.46680   0.85446  -0.33401   0.38679   0.69093   0.81304   0.95845  -0.00036   0.65471   0.54999   0.80931
             0.0000    0.2775    0.0077    0.6374    0.1132    0.0794    0.0001    0.2886    0.1544    0.0015    0.0002    0.0001    0.9991    0.0081    0.0180    0.0003
                 18        12        15        18        18        15        18        12        15        18        15        18        12        15        18        15

ASDICC      0.34138   1.00000   0.15614   0.52650  -0.27018  -0.44880   0.02281  -0.72231  -0.52497   0.55796  -0.42256   0.21723   0.34635  -0.10760   0.54463  -0.49600
             0.2775    0.0000    0.6883    0.0787    0.3957    0.1932    0.9439    0.0080    0.1467    0.0594    0.2238    0.4977    0.2701    0.7829    0.0671    0.1430
                 12        12         9        12        12        10        12        12         9        12        10        12        12         9        12        10

CRDICC      0.65764   0.15614   1.00000   0.04970  -0.01210   0.44318   0.66615   0.11867   0.35819   0.57001   0.55966   0.68740   0.45092   0.87395   0.46021   0.57936
             0.0077    0.6883    0.0000    0.8604    0.9659    0.1490    0.0067    0.7611    0.1899    0.0265    0.0585    0.0046    0.2232    0.0001    0.0843    0.0484
                 15         9        15        15        15        12        15         9        15        15        12        15     Y(?)         15        15        12

PBDICC      0.11925   0.52650   0.04970   1.00000  -0.38976  -0.25047  -0.16227  -0.31363  -0.32691   0.47164  -0.31174  -0.03087   0.27279  -0.13533   0.71770  -0.33231
             0.6374    0.0787    0.8604    0.0000    0.1098    0.3679    0.5200    0.3209    0.2343    0.0482    0.2580    0.9032    0.3910    0.6306    0.0008    0.2262
                 18        12        15        18        18        15        18        12        15        18        15        18        12        15        18        15

DATE        0.38645  -0.27018  -0.01210  -0.38976   1.00000   0.36223   0.42459   0.05648   0.50242   0.17617   0.45456   0.42238  -0.28169   0.25463  -0.02312   0.40678
             0.1132    0.3957    0.9659    0.1098    0.0000    0.1846    0.0790    0.8616    0.0563    0.4844    0.0887    0.0808    0.3751    0.3597    0.9275    0.0657
                 18        12        15        18        18        15        18        12        15        18        15        18        12        15        18        15

SO4DICC     0.46680  -0.44880   0.44318  -0.25047   0.36223   1.00000   0.35295  -0.25386   0.12203   0.28946   0.48576   0.41714  -0.73638   0.36453   0.19049   0.65727
             0.0794    0.1932    0.1490    0.3679    0.1846    0.0000    0.1969    0.4791    0.7056    0.2954    0.0664    0.1219    0.0152    0.2440    0.4965    0.0078
                 15        10        12        15        15        15        15        10        12        15        15        15        10        12        15        15

MASSDICF    0.85446   0.02281   0.66615  -0.16227   0.42459   0.35295   1.00000   0.16924   0.64481   0.67345   0.89914   0.96715   0.25982   0.79501   0.43785   0.85728
             0.0001    0.9439    0.0067    0.5200    0.0790    0.1969    0.0000    0.5990    0.0095    0.0022    0.0001    0.0001    0.4148    0.0004    0.0692    0.0001
                 18        12        15        18        18        15        18        12        15        18        15        18        12        15        18        15

ASDICF     -0.33401  -0.72231   0.11867  -0.31363   0.05648  -0.25386   0.16924   1.00000   0.55397  -0.37353   0.51250  -0.10731   0.39859   0.33428  -0.35744   0.36002
             0.2886    0.0080    0.7611    0.3209    0.8616    0.4791    0.5990    0.0000    0.1217    0.2317    0.1299    0.7399    0.1993    0.3791    0.2540    0.3068
                 12        12         9        12        12        10        12        12         9        12        10        12        12         9        12        10

CRDICF      0.38679  -0.52497   0.35819  -0.32691   0.50242   0.12203   0.64481   0.55397   1.00000   0.35215   0.69216   0.54525   0.07440   0.76677   0.15414   0.63331
             0.1544    0.1467    0.1899    0.2343    0.0563    0.7056    0.0095    0.1217    0.0000    0.1980    0.0126    0.0355    0.8491    0.0009    0.5834    0.0271
                 15         9        15        15        15        12        15         9        15        15        12        15         9        15        15        12

PBDICF      0.69093   0.55796   0.57001   0.47164   0.17617   0.28946   0.67345  -0.37353   0.35215   1.00000   0.54008   0.70782   0.23325   0.57826   0.94476   0.53041
             0.0015    0.0594    0.0265    0.0482    0.4844    0.2954    0.0022    0.2317    0.1980    0.0000    0.0377    0.0010    0.4656    0.0239    0.0001    0.0419
                 18        12        15        18        18        15        18        12        15        18        15        18        12        15        18        15

SO4DICF     0.81304  -0.42256   0.55966  -0.31174   0.45456   0.48576   0.89914   0.51250   0.69216   0.54008   1.00000   0.88202  -0.02238   0.73609   0.33333   0.97787
             0.0002    0.2238    0.0585    0.2580    0.0887    0.0664    0.0001    0.1299    0.0126    0.0377    0.0000    0.0001    0.9511    0.0063    0.2247    0.0001
                 15        10        12        15        15        15        15        10        12        15        15        15        10        12        15        15

MASSDICT    0.95845   0.21723   0.68740  -0.03087   0.42238   0.41714   0.96715  -0.10731   0.54525   0.70782   0.88202   1.00000   0.14252   0.75778   0.50943   0.85759
             0.0001    0.4977    0.0046    0.9032    0.0808    0.1219    0.0001    0.7399    0.0355    0.0010    0.0001    0.0000    0.6586    0.0011    0.0308    0.0001
                 18        12        15        18        18        15        18        12        15        18        15        18        12        15        18        15

ASDICT     -0.00036   0.34635   0.45092   0.27279  -0.28169  -0.73638   0.25982   0.39859   0.07440   0.23325  -0.02238   0.14252   1.00000   0.38380   0.23743  -0.24420
             0.9991    0.2701    0.2232    0.3910    0.3751    0.0152    0.4148    0.1993    0.8491    0.4656    0.9511    0.6586    0.0000    0.3079    0.4575    0.4966
                 12        12         9        12        12        10        12        12         9        12        10        12        12         9        12        10

CRDICT      0.65471  -0.10760   0.87395  -0.13533   0.25463   0.36453   0.79501   0.33428   0.76677   0.57826   0.73609   0.75778   0.38380   1.00000   0.39926   0.71929
             0.0081    0.7829    0.0001    0.6306    0.3597    0.2440    0.0004    0.3791    0.0009    0.0239    0.0063    0.0011    0.3079    0.0000    0.1404    0.0084
                 15         9        15        15        15        12        15         9        15        15        12        15         9        15        15        12

PBDICT      0.54999   0.54463   0.46021   0.71770  -0.02312   0.19049   0.43785  -0.35744   0.15414   0.94476   0.33333   0.50943   0.23743   0.39926   1.00000   0.32732
             0.0180    0.0671    0.0843    0.0008    0.9275    0.4965    0.0692    0.2540    0.5834    0.0001    0.2247    0.0308    0.4575    0.1404    0.0000    0.2337
                 18        12        15        18        18        15        18        12        15        18        15        18        12        15        18        15

SO4DICT     0.80931  -0.49600   0.57936  -0.33231   0.40678   0.65727   0.85728   0.36002   0.63331   0.53041   0.97787   0.85759  -0.24420   0.71929   0.32732   1.00000
             0.0003    0.1430    0.0484    0.2262    0.0657    0.0078    0.0001    0.3068    0.0271    0.0419    0.0001    0.0001    0.4966    0.0084    0.2337    0.0000
                 15        10        12        15        15        15        15        10        12        15        15        15     Y(?)         12        15        15
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                            CORRELATION ANALYSIS OF DIC DATA COARSE VS FINE VS TOTAL BY CITY                                       640
                                                           CITY=TO

                        CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

            MASSDICC    ASDICC    CRDICC    PBDICC      DATE   SO4DICC  MASSDICF    ASDICF    CRDICF    PBDICF   SO4DICF  MASSDICT    ASDICT    CRDICT    PBDICT   SO4DICT

MASSDICC     1.00000   0.28439   0.33275  -0.16677   0.36372   0.40827   0.34186   0.20834   0.48155   0.39981   0.26097   0.77802   0.26405   0.43597   0.28573   0.28326
              0.0000    0.3244    0.0967    0.3963    0.0443    0.0476    0.0598    0.4748    0.0127    0.0350    0.2181    0.0001    0.3616    0.0118    0.1391    0.1798
                  31        14        26        28        31        24        31        14        26        28        24        31        14        26        28        24

ASDICC       0.28439   1.00000   0.03347   0.24081  -0.56359  -0.21115  -0.18525   0.61658  -0.04192  -0.04718  -0.16165  -0.00283   0.84245  -0.00028   0.07293  -0.17296
              0.3244    0.0000    0.9136    0.4069    0.0358    0.4886    0.5260    0.0189    0.8918    0.8728    0.5978    0.9923    0.0002    0.9993    0.8043    0.5720
                  14        14        13        14        14        13        14        14        13        14        13        14        14        13        14        13

CRDICC       0.33275   0.03347   1.00000  -0.41707  -0.09083   0.24491   0.17874  -0.06851   0.38114  -0.02355   0.12846   0.30058  -0.02932   0.84349  -0.22671   0.14219
              0.0967    0.9136    0.0000    0.0340    0.6590    0.2846    0.3823    0.8240    0.0547    0.9091    0.5789    0.1357    0.9242    0.0001    0.2654    0.5287
                  26        13        26        26        26        21        26        13        26        26        21        26        13        26        26        21

PBDICC      -0.16677   0.24081  -0.41707   1.00000  -0.26312  -0.03886  -0.15160   0.54164  -0.35905  -0.10019  -0.02115  -0.19871   0.47174  -0.46641   0.39831  -0.02456
              0.3963    0.4069    0.0340    0.0000    0.1761    0.8603    0.4412    0.0454    0.0716    0.6120    0.9237    0.3107    0.0886    0.0163    0.0358    0.9114
                  28        14        26        28        28        23        28        14        26        28        23        28        14        26        28        23

DATE         0.36372  -0.56359  -0.09083  -0.26312   1.00000   0.29068   0.50628  -0.59179  -0.07379   0.00624   0.15976   0.53918  -0.63973  -0.09949  -0.12326   0.18077
              0.0443    0.0358    0.6590    0.1761    0.0000    0.1682    0.0037    0.0258    0.7202    0.9749    0.4559    0.0018    0.0137    0.6287    0.5320    0.3979
                  31        14        26        28        32        24        31        14        26        28        24        31        14        26        28        24

SO4DICC      0.40827  -0.21115   0.24491  -0.03886   0.29068   1.00000   0.42624  -0.04239   0.13982   0.20203   0.38903   0.52155  -0.11475   0.23531   0.16453   0.46225
              0.0476    0.4886    0.2846    0.8603    0.1682    0.0000    0.0378    0.8906    0.5455    0.3552    0.0603    0.0090    0.7089    0.3045    0.4531    0.0229
                  24        13        21        23        24        24        24        13        21        23        24        24        13        21        23        24

MASSDICF     0.34186  -0.18525   0.17874  -0.15160   0.50628   0.42624   1.00000  -0.08814  -0.10717   0.52309   0.74770   0.85635  -0.13686   0.04704   0.40774   0.76058
              0.0598    0.5260    0.3823    0.4412    0.0037    0.0378    0.0000    0.7645    0.6023    0.0043    0.0001    0.0001    0.6408    0.8195    0.0313    0.0001
                  31        14        26        28        31        24        31        14        26        28        24        31        14        26        28        24

ASDICF       0.20834   0.61658  -0.06851   0.54164  -0.59179  -0.04239  -0.08814   1.00000  -0.26787   0.30865   0.19490   0.03105   0.94357  -0.18406   0.52045   0.18213
              0.4748    0.0189    0.8240    0.0454    0.0258    0.8906    0.7645    0.0000    0.3762    0.2830    0.5234    0.9161    0.0001    0.5472    0.0564    0.5515
                  14        14        13        14        14        13        14        14        13        14        13        14        14        13        14        13

CRDICF       0.48155  -0.04192   0.38114  -0.35905  -0.07379   0.13982  -0.10717  -0.26787   1.00000   0.18952  -0.08624   0.18412  -0.19634   0.81806  -0.00122  -0.07292
              0.0127    0.8918    0.0547    0.0716    0.7202    0.5455    0.6023    0.3762    0.0000    0.3538    0.7101    0.3679    0.5203    0.0001    0.9953    0.7534
                  26        13        26        26        26        21        26        13        26        26        21        26        13        26        26        21

PBDICF       0.39981  -0.04718  -0.02355  -0.10019   0.00624   0.20203   0.52309   0.30865   0.18952   1.00000   0.75410   0.58406   0.18998   0.09237   0.87273   0.73789
              0.0350    0.8728    0.9091    0.6120    0.9749    0.3552    0.0043    0.2830    0.3538    0.0000    0.0001    0.0011    0.5153    0.6536    0.0001    0.0001
                  28        14        26        28        28        23        28        14        26        28        23        28        14        26        28        23

SO4DICF      0.26097  -0.16165   0.12846  -0.02115   0.15976   0.38903   0.74770   0.19490  -0.08624   0.75410   1.00000   0.65307   0.06653   0.02893   0.67747   0.99665
              0.2181    0.5978    0.5789    0.9237    0.4559    0.0603    0.0001    0.5234    0.7101    0.0001    0.0000    0.0005    0.8290    0.9009    0.0004    0.0001
                  24        13        21        23        24        24        24        13        21        23        24        24        13        21        23        24

MASSDICT     0.77802  -0.00283   0.30058  -0.19871   0.53918   0.52155   0.85635   0.03105   0.18412   0.58406   0.65307   1.00000   0.02187   0.29224   0.44086   0.67457
              0.0001    0.9923    0.1357    0.3107    0.0018    0.0090    0.0001    0.9161    0.3679    0.0011    0.0005    0.0000    0.9409    0.1474    0.0189    0.0003
                  31        14        26        28        31        24        31        14        26        28        24        31        14        26        28        24

ASDICT       0.26405   0.84245  -0.02932   0.47174  -0.63973  -0.11475  -0.13686   0.94357  -0.19634   0.18998   0.06653   0.02187   1.00000  -0.12144   0.38554   0.05325
              0.3616    0.0002    0.9242    0.0886    0.0137    0.7089    0.6408    0.0001    0.5203    0.5153    0.8290    0.9409    0.0000    0.6927    0.1734    0.8628
                  14        14        13        14        14        13        14        14        13        14        13        14        14        13        14        13

CRDICT       0.43597  -0.00028   0.84349  -0.46641  -0.09949   0.23531   0.04704  -0.18406   0.81806   0.09237   0.02893   0.29224  -0.12144   1.00000  -0.14378   0.04538
              0.0118    0.9993    0.0001    0.0163    0.6287    0.3045    0.8195    0.5472    0.0001    0.6536    0.9009    0.1474    0.6927    0.0000    0.4835    0.8452
                  26        13        26        26        26        21        26        13        26        26        21        26        13        26        26        21

PBDICT       0.28573   0.07293  -0.22671   0.39831  -0.12326   0.16453   0.40774   0.52045  -0.00122   0.87273   0.67747   0.44086   0.38554  -0.14378   1.00000   0.66092
              0.1391    0.8043    0.2654    0.0358    0.5320    0.4531    0.0313    0.0564    0.9953    0.0001    0.0004    0.0189    0.1734    0.4835    0.0000    0.0006
                  28        14        26        28        28        23        28        14        26        28        23        28        14        26        28        23

SO4DICT      0.28326  -0.17296   0.14219  -0.02456   0.18077   0.46225   0.76058   0.18213  -0.07292   0.73789   0.99665   0.67457   0.05325   0.04538   0.66092   1.00000
              0.1798    0.5720    0.5287    0.9114    0.3979    0.0229    0.0001    0.5515    0.7534    0.0001    0.0001    0.0003    0.8628    0.8452    0.0006    0.0000
                  24        13        21        23        24        24        24        13        21        23        24        24
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                        CORRELATION ANALYSIS OF DIC DATA C VS F VS T BY CITY SEASON                                   700
                                        CITY=TO    SEASON=FALL

                 CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

          MASSDICC    ASDICC    CHDICC    PBDICC      DATE   SO4DICC  MASSDICF    ASDICF    CRDICF    PBDICF   SO4DICF  MASSDICT    ASDICT    CHDICT    PBDICT   SO4DICT

MASSDICC   1.00000   0.44711   0.48731   0.01513  -0.16254   0.44186   0.68372   0.35521   0.23793   0.57514   0.68207   0.88344   0.43623   0.47957   0.53105   0.68234
            0.0000    0.1680    0.0402    0.9510    0.4815    0.0866    0.0006    0.2837    0.3417    0.0100    0.0036    0.0001    0.1798    0.0443    0.0193    0.0036
                21        11        18        19        21        16        21        11        18        19        16        21        11        18        19        16

ASDICC     0.44711   1.00000   0.00208   0.21031  -0.71017  -0.20155  -0.08372   0.58720  -0.11147  -0.07078  -0.13565   0.13505   0.82954  -0.05133   0.03530  -0.14036
            0.1680    0.0000    0.9954    0.5348    0.0143    0.5766    0.8067    0.0575    0.7592    0.8362    0.7087    0.6922    0.0016    0.8880    0.9110    0.6989
                11        11        10        11        11        10        11        11        10        11        10        11        11        10        11        10

CRDICC     0.48731   0.00208   1.00000  -0.49380   0.29903   0.38999   0.52828  -0.10400   0.24315   0.04814   0.20975   0.56023  -0.06657   0.85247  -0.19919   0.22393
            0.0402    0.9954    0.0000    0.0373    0.2780    0.1681    0.0242    0.7749    0.3309    0.8496    0.4717    0.0156    0.8550    0.0001    0.4281    0.4415
                18        10        18        18        18        14        18        10        18        18        14        18        10        18        18        14

PBDICC     0.01513   0.21031  -0.49380   1.00000  -0.35549   0.02906  -0.13295   0.52881  -0.35530  -0.07831  -0.00188  -0.07830   0.45396  -0.54610   0.42029   0.00015
            0.9510    0.5348    0.0373    0.0000    0.1353    0.9181    0.5874    0.0944    0.1479    0.7500    0.9947    0.7500    0.1608    0.0190    0.0732    0.9996
                19        11        18        19        19        15        19        11        18        19        15        19        11        18        19        15

DATE      -0.16254  -0.71017   0.29903  -0.35549   1.00000   0.32216   0.19629  -0.76378   0.29617  -0.16720   0.02327   0.05528  -0.82637   0.37679  -0.32690   0.04134
            0.4815    0.0143    0.2780    0.1353    0.0000    0.2237    0.3938    0.0062    0.2294    0.4939    0.9318    0.8119    0.0017    0.1232    0.1719    0.8792
                21        11        18        19        22        16        21        11        18        19        16        21        11        18        19        16

SO4DICC    0.44186  -0.20155   0.38999   0.02906   0.32216   1.00000   0.68589   0.07867   0.10634   0.41939   0.62785   0.63195  -0.02972   0.34166   0.38278   0.66493
            0.0866    0.5766    0.1681    0.9181    0.2237    0.0000    0.0034    0.8290    0.7175    0.1197    0.0092    0.0086    0.9350    0.2319    0.1591    0.0049
                16        10        14        15        16        16        16        10        14        15        16        16        10        14        15        16

MASSDICF   0.68372  -0.08372   0.52828  -0.13295   0.19629   0.68589   1.00000   0.03894   0.27144   0.64455   0.76162   0.94594  -0.00800   0.52471   0.52118   0.77375
            0.0006    0.8067    0.0242    0.5874    0.3938    0.0034    0.0000    0.9095    0.2759    0.0029    0.0006    0.0001    0.9814    0.0254    0.0221    0.0004
                21        11        18        19        21        16        21        11        18        19        16        21        11        18        19        16

ASDICF     0.35521   0.58720  -0.10400   0.52881  -0.76378   0.07867   0.03894   1.00000  -0.39155   0.30477   0.25933   0.17622   0.93910  -0.26189   0.51467   0.25078
            0.2837    0.0575    0.7749    0.0944    0.0062    0.8290    0.9095    0.0000    0.2632    0.3622    0.4693    0.6043    0.0001    0.4648    0.1052    0.4846
                11        11        10        11        11        10        11        11        10        11        10        11        11        10        11        10

CRDICF     0.23793  -0.11147   0.24315  -0.35530   0.29617   0.10634   0.27144  -0.39155   1.00000   0.25307   0.09889   0.28186  -0.31039   0.71432   0.05649   0.10202
            0.3417    0.7592    0.3309    0.1479    0.2294    0.7175    0.2759    0.2632    0.0000    0.3110    0.7366    0.2572    0.3827    0.0009    0.8238    0.7286
                18        10        18        18        18        14        18        10        18        18        14        18        10        18        18        14

PBDICF     0.57514  -0.07078   0.04814  -0.07831  -0.16720   0.41939   0.64455   0.30477   0.25307   1.00000   0.87701   0.66866   0.17880   0.16770   0.87169   0.86228
            0.0100    0.8362    0.8496    0.7500    0.4939    0.1197    0.0029    0.3622    0.3110    0.0000    0.0001    0.0017    0.5989    0.5059    0.0001    0.0001
                19        11        18        19        19        15        19        11        18        19        15        19        11        18        19        15

SO4DICF    0.68207  -0.13565   0.20975  -0.00188   0.02327   0.62785   0.76162   0.25933   0.09889   0.87701   1.00000   0.78219   0.12053   0.20309   0.76819   0.99880
            0.0036    0.7087    0.4717    0.9947    0.9318    0.0092    0.0006    0.4693    0.7366    0.0001    0.0000    0.0003    0.7401    0.4862    0.0008    0.0001
                16        10        14        15        16        16        16        10        14        15        16        16        10        14        15        16

MASSDICT   0.88344   0.13505   0.56023  -0.07830   0.05528   0.63195   0.94594   0.17622   0.28186   0.66866   0.78219   1.00000   0.17993   0.55428   0.57009   0.79020
            0.0001    0.6922    0.0156    0.7500    0.8119    0.0086    0.0001    0.6043    0.2572    0.0017    0.0003    0.0000    0.5965    0.0170    0.0108    0.0003
                21        11        18        19        21        16        21        11        18        19        16        21        11        18        19        16

ASDICT     0.43623   0.82954  -0.06657   0.45396  -0.82637  -0.02972  -0.00800   0.93910  -0.31039   0.17880   0.12053   0.17993   1.00000  -0.19606   0.37004   0.11276
            0.1798    0.0016    0.8550    0.1608    0.0017    0.9350    0.9814    0.0001    0.3827    0.5989    0.7401    0.5965    0.0000    0.5872    0.2626    0.7565
                11        11        10        11        11        10        11        11        10        11        10        11        11        10        11        10

CRDICT     0.47957  -0.05133   0.85247  -0.54610   0.37679   0.34166   0.52471  -0.26189   0.71432   0.16770   0.20309   0.55428  -0.19606   1.00000  -0.11557   0.21524
            0.0443    0.8880    0.0001    0.0190    0.1232    0.2319    0.0254    0.4648    0.0009    0.5059    0.4862    0.0170    0.5872    0.0000    0.6479    0.4599
                18        10        18        18        18        14        18        10        18        18        14        18        10        18        13        14

PBDICT     0.53105   0.03530  -0.19919   0.42029  -0.32690   0.38278   0.52118   0.51467   0.05649   0.87169   0.76819   0.57009   0.37004  -0.11557   1.00000   0.75632
            0.0193    0.9110    0.4281    0.0732    0.1719    0.1591    0.0221    0.1052    0.8238    0.0001    0.0008    0.0108    0.2626    0.6479    0.0000    0.0011
                19        11        18        19        19        15        19        11        18        19        15        19        11        13        19        15

SO4DICT    0.68234  -0.14036   0.22393   0.00015   0.04134   0.66493   0.77375   0.25078   0.10202   0.86228   0.99880   0.79020   0.11276   0.21524   0.75632   1.00000
            0.0036    0.6989    0.4415    0.9996    0.8792    0.0049    0.0004    0.4846    0.7286    0.0001    0.0001    0.0003    0.7565    0.4599    0.0011    0.0000
                16        10        14        15        16        16        16        10        14        15        16
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                  CORRELATION ANALYSIS OF CIC DATA C VS F VS T BY CITY SEASON
                                  CITY=TO   SEASON=WINT

            CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

          MASSDICC    ASDICC    CRDICC    PBDICC      DATE   SO4DICC  MASSDICF    ASDICF    CRDICF    PBDICF   SO4DICF  MASSDICT    ASDICT    CRDICT    PBDICT   SO4DICT

MASSDICC   1.00000   0.00000   0.55071  -0.30789  -0.42435   0.19093  -0.65454   0.00000   0.89153   0.13383  -0.74671   0.23731   0.00000   0.79934   0.01485  -0.71996
            0.0000    1.0000    0.1572    0.4202    0.2216    0.6506    0.0400    1.0000    0.0029    0.7314    0.0333    0.5091    1.0000    0.0173    0.9698    0.0440
                10         3         8         9        10         8        10         3         8         9         8        10         3         8         9         8

ASDICC     0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000
            1.0000    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000
                 3         3         3         3         3         3         3         3         3         3         3         3         3         3         3         3

CRDICC     0.55071   0.00000   1.00000  -0.55770  -0.58991   0.24845  -0.45208   0.00000   0.78028  -0.28683  -0.03965   0.10612   0.00000   0.91681  -0.45533   0.00084
            0.1572    1.0000    0.0000    0.1509    0.1237    0.5911    0.2608    1.0000    0.0223    0.4910    0.9327    0.8025    1.0000    0.0014    0.2569    0.9986
                 8         3         8         8         8         7         8         3         8         8         7         8    Y(3)         8         8         7

PBDICC    -0.30789   0.00000  -0.55770   1.00000   0.87235  -0.01963   0.24090   0.00000  -0.70828  -0.09554   0.13646  -0.09751   0.00000  -0.68490   0.27946   0.12443
            0.4202    1.0000    0.1509    0.0000    0.0022    0.9632    0.5324    1.0000    0.0493    0.8068    0.7473    0.8029    1.0000    0.0609    0.4665    0.7691
                 9         3         8         9         9         8         9         3         8         9         8         9         3         8         9         8

DATE      -0.42435   0.00000  -0.58991   0.87235   1.00000  -0.21473   0.29556   0.00000  -0.90397  -0.04694   0.43214  -0.07664   0.00000  -0.82402   0.27881   0.38906
            0.2216    1.0000    0.1237    0.0022    0.0000    0.6096    0.4070    1.0000    0.0021    0.9045    0.2850    0.8333    1.0000    0.0119    0.4675    0.3408
                10         3         8         9        10         8        10         3         8         9         8        10         3         8         9         8

SO4DICC    0.19093   0.00000   0.24845  -0.01963  -0.21473   1.00000  -0.09774   0.00000   0.16011  -0.35743  -0.10638   0.17835   0.00000   0.20552  -0.42035   0.06628
            0.6506    1.0000    0.5911    0.9632    0.6096    0.0000    0.8179    1.0000    0.7317    0.3847    0.8020    0.6726    1.0000    0.6584    0.2958    0.8761
                 8         3         7         8         8         8         8         3         7         8         8         8         3         7         8         8

MASSDICF  -0.55454   0.00000  -0.45208   0.24090   0.29556  -0.09774   1.00000   0.00000  -0.79346   0.20305   0.92685   0.57909   0.00000  -0.69630   0.28513   0.91759
            0.0400    1.0000    0.2608    0.5324    0.4070    0.8179    0.0000    1.0000    0.0188    0.6003    0.0009    0.0794    1.0000    0.0550    0.4571    0.0013
                10         3         8         9        10         8        10         3         8         9         8        10         3         8         9         8

ASDICF     0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000
            1.0000    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000
                 3         3         3         3         3         3         3         3         3         3         3         3         3         3         3         3

CRDICF     0.89153   0.00000   0.78028  -0.70828  -0.90397   0.16011  -0.79346   0.00000   1.00000   0.08051  -0.60395   0.06493   0.00000   0.96511  -0.14807  -0.58078
            0.0029    1.0000    0.0223    0.0493    0.0021    0.7317    0.0188    1.0000    0.0000    0.8497    0.1510    0.8786    1.0000    0.0001    0.7264    0.1715
                 8         3         8         8         8         7         8         3         8         8         7         8         3         8         8         7

PBDICF     0.13383   0.00000  -0.28683  -0.09554  -0.04694  -0.35743   0.20305   0.00000   0.08051   1.00000  -0.03230   0.63516   0.00000  -0.06973   0.92907  -0.08650
            0.7314    1.0000    0.4910    0.8068    0.9045    0.3847    0.6003    1.0000    0.8497    0.0000    0.9395    0.0661    1.0000    0.8697    0.0003    0.8386
                 9         3         8         9         9         8         9         3         8         9         8         9         3         8         9         8

SO4DICF   -0.74671   0.00000  -0.03965   0.13646   0.43214  -0.10638   0.92685   0.00000  -0.60395  -0.03230   1.00000   0.35563   0.00000  -0.40798   0.01709   0.98498
            0.0333    1.0000    0.9327    0.7473    0.2850    0.8020    0.0009    1.0000    0.1510    0.9395    0.0000    0.3873    1.0000    0.3636    0.9680    0.0001
                 8         3         7         8         8         8         8         3         7         8         8         8         3         7         8         8

MASSDICT   0.23731   0.00000   0.10612  -0.09751  -0.07664   0.17835   0.57909   0.00000   0.06493   0.63516   0.35563   1.00000   0.00000   0.08451   0.57627   0.38911
            0.5091    1.0000    0.8025    0.8029    0.8333    0.6726    0.0794    1.0000    0.8786    0.0661    0.3873    0.0000    1.0000    0.8423    0.1044    0.3407
                10         3         8         9        10         8        10         3         8         9         8        10         3         8         9         8

ASDICT     0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000
            1.0000    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000    1.0000
                 3         3         3         3         3         3         3         3         3         3         3         3         3         3         3         3

CRDICT     0.79934   0.00000   0.91681  -0.68490  -0.82402   0.20552  -0.69630   0.00000   0.96511  -0.06973  -0.40798   0.08451   0.00000   1.00000  -0.28592  -0.37639
            0.0173    1.0000    0.0014    0.0609    0.0119    0.6584    0.0550    1.0000    0.0001    0.8697    0.3636    0.8423    1.0000    0.0000    0.4924    0.4053
                 8         3         8         8         8         7         8         3         8         8         7         8         3         8         8         7

PBDICT     0.01485   0.00000  -0.45533   0.27946   0.27881  -0.42035   0.28513   0.00000  -0.14807   0.92907   0.01709   0.57627   0.00000  -0.28592   1.00000  -0.05029
            0.9698    1.0000    0.2569    0.4665    0.4675    0.2958    0.4571    1.0000    0.7264    0.0003    0.9680    0.1044    1.0000    0.4924    0.0000    0.9059
                 9         3         8         9         9         8         9         3         8         9         8         9         3         8         9         8

SO4DICT   -0.71996   0.00000   0.00084   0.12443   0.38906   0.06628   0.91759   0.00000  -0.58078  -0.08650   0.98498   0.38911   0.00000  -0.37639  -0.05029   1.00000
            0.0440    1.0000    0.9986    0.7691    0.3408    0.8761    0.0013    1.0000    0.1715    0.8386    0.0001    0.3407    1.0000    0.4053    0.9059    0.0000
                 8         3         7         8         8         8         8         3         7         8         8         8    Y(3)         7         8         8
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CORRELATION ANALYSIS OF CIC DATA C VS F VS T BY CITY SEASON
CITY=DI SEASON=WINT

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	MASSDICC	ASDICC	CRDICC	PBDICC	DATE	SO4DICC	MASSDICF	ASDICF	CRDICF	PBDICF	SO4DICF	MASSDICT	ASDICT	CRDICT	PBDICT	SO4DICT
MASSDICC	1.00000 0.0000 13	0.11261 0.7569 10	0.01736 0.9646 9	0.23468 0.4628 12	-0.09817 0.7497 13	0.02792 0.9432 9	0.33962 0.2562 13	0.14800 0.6832 10	0.20182 0.6026 9	0.07823 0.8090 12	0.05259 0.8931 9	0.97320 0.0001 13	0.11691 0.7477 10	0.21239 0.5833 9	0.14458 0.6539 12	0.07547 0.8470 9
ASDICC	0.11261 0.7568 10	1.00000 0.0000 10	-0.23554 0.6111 7	0.93061 0.0001 10	-0.18577 0.6074 10	0.43579 0.3284 7	0.47304 0.1673 10	0.92136 0.0002 10	0.08359 0.8586 7	0.78273 0.0074 10	0.74950 0.0524 7	0.20718 0.5657 10	0.99932 0.0001 10	-0.09036 0.8472 7	0.87219 0.0010 10	0.69075 0.0857 7
CRDICC	0.01736 0.9646 9	-0.23554 0.6111 7	1.00000 0.0000 9	-0.01264 0.9743 9	0.28135 0.4633 9	-0.30326 0.4653 8	-0.04670 0.9050 9	-0.24389 0.5982 7	-0.34371 0.3651 9	-0.01654 0.9663 9	-0.41816 0.3026 8	0.00500 0.9898 9	-0.23768 0.6078 Y(7)	0.36420 0.3352 9	-0.01615 0.9671 9	-0.47631 0.2328 8
PBDICC	0.23468 0.4628 12	0.93061 0.0001 10	-0.01264 0.9743 9	1.00000 0.0000 12	0.03935 0.9033 12	0.44646 0.2283 9	0.43599 0.1565 12	0.83541 0.0026 10	-0.08028 0.8373 9	0.78014 0.0028 12	0.55442 0.1214 9	0.31753 0.3146 12	0.92788 0.0001 10	-0.08853 0.8208 9	0.91084 0.0001 12	0.60776 0.0825 9
DATE	-0.09817 0.7497 13	-0.18577 0.6074 10	0.28135 0.4633 9	0.03935 0.9033 12	1.00000 0.0000 13	0.21854 0.5721 9	-0.17619 0.5648 13	-0.23427 0.5147 10	0.29107 0.4473 9	-0.46919 0.1239 12	-0.12934 0.7402 9	-0.13029 0.6714 13	-0.19167 0.5959 10	0.48704 0.1836 9	-0.29402 0.3536 12	-0.02594 0.9472 9
SO4DICC	0.02792 0.9432 9	0.43579 0.3284 7	-0.30326 0.4653 8	0.44646 0.2283 9	0.21854 0.5721 9	1.00000 0.0000 9	0.41308 0.2691 9	0.17120 0.7136 7	0.34093 0.4086 8	0.39153 0.2974 9	0.37603 0.3186 9	0.18248 0.6384 9	0.41415 0.3555 7	0.06374 0.8808 8	0.43640 0.2402 9	0.70785 0.0329 9
MASSDICF	0.33962 0.2562 13	0.47304 0.1673 10	-0.04670 0.9050 9	0.43599 0.1565 12	-0.17619 0.5648 13	0.41308 0.2691 9	1.00000 0.0000 13	0.28636 0.4225 10	0.67614 0.0456 9	0.44451 0.1477 12	0.64277 0.0619 9	0.54680 0.0531 13	0.45862 0.1825 10	0.63763 0.0647 9	0.46594 0.1268 12	0.63095 0.0684 9
ASDICF	0.14800 0.6832 10	0.92136 0.0002 10	-0.24389 0.5982 7	0.83541 0.0026 10	-0.23427 0.5147 10	0.17120 0.7136 7	0.28636 0.4225 10	1.00000 0.0000 10	0.03530 0.9401 7	0.66185 0.0371 10	0.54557 0.2053 7	0.19815 0.5832 10	0.93510 0.0001 10	-0.14547 0.7556 7	0.75659 0.0113 10	0.45399 0.3062 7
CRDICF	0.20182 0.6026 9	0.08359 0.8586 7	-0.34371 0.3651 9	-0.08028 0.8373 9	0.29107 0.4473 9	0.34093 0.4086 8	0.67614 0.0456 9	0.03530 0.9401 7	1.00000 0.0000 9	-0.27484 0.4742 9	0.57606 0.1350 8	0.36491 0.3342 9	0.07962 0.8653 7	0.74940 0.0201 9	-0.21675 0.5754 9	0.55669 0.1518 8
PBDICF	0.07823 0.8090 12	0.78273 0.0074 10	-0.01654 0.9663 9	0.78014 0.0028 12	-0.46919 0.1239 12	0.39153 0.2974 9	0.44451 0.1477 12	0.66185 0.0371 10	-0.27484 0.4742 9	1.00000 0.0000 12	0.46967 0.2021 9	0.17572 0.5849 12	0.77655 0.0082 10	-0.28423 0.4586 9	0.96881 0.0001 12	0.52420 0.1474 9
SO4DICF	0.05259 0.8931 9	0.74950 0.0524 7	-0.41816 0.3026 8	0.55442 0.1214 9	-0.12934 0.7402 9	0.37603 0.3186 9	0.64277 0.0619 9	0.54557 0.2053 7	0.57606 0.1350 8	0.46967 0.2021 9	1.00000 0.0000 9	0.29265 0.4447 9	0.73505 0.0595 7	0.18168 0.6668 8	0.53086 0.1414 9	0.91890 0.0005 9
MASSDICT	0.97320 0.0001 13	0.20718 0.5657 10	0.00500 0.9898 9	0.31753 0.3146 12	-0.13029 0.6714 13	0.18248 0.6384 9	0.54680 0.0531 13	0.19815 0.5832 10	0.36491 0.3342 9	0.17572 0.5849 12	0.29265 0.4447 9	1.00000 0.0000 13	0.20791 0.5643 10	0.36542 0.3335 9	0.24171 0.4491 12	0.31237 0.4131 9
ASDICT	0.11691 0.7477 10	0.99932 0.0001 10	-0.23768 0.6078 7	0.92788 0.0001 10	-0.19167 0.5958 10	0.41416 0.3556 7	0.45862 0.1825 10	0.93510 0.0001 10	0.07962 0.8653 7	0.77656 0.0082 10	0.73506 0.0598 7	0.20791 0.5643 10	1.00000 0.0000 10	-0.09597 0.8378 7	0.86713 0.0012 10	0.67302 0.0975 7
CRDICT	0.21239 0.5833 9	-0.09036 0.8472 7	0.36420 0.3352 9	-0.08853 0.8208 9	0.48704 0.1836 9	0.06374 0.8808 8	0.63763 0.0647 9	-0.14547 0.7556 7	0.74940 0.0201 9	-0.28423 0.4586 9	0.18168 0.6668 8	0.36542 0.3335 9	-0.09597 0.8378 7	1.00000 0.0000 9	-0.22635 0.5581 9	0.11889 0.7792 8
PBDICT	0.14458 0.6539 12	0.87219 0.0010 10	-0.01615 0.9671 9	0.91084 0.0001 12	-0.29402 0.3536 12	0.43640 0.2402 9	0.46594 0.1268 12	0.75659 0.0113 10	-0.21675 0.5754 9	0.96881 0.0001 12	0.53086 0.1414 9	0.24171 0.4491 12	0.86713 0.0012 10	-0.22635 0.5581 9	1.00000 0.0000 12	0.58820 0.0957 9
SO4DICT	0.07547 0.8470 9	0.69075 0.0857 7	-0.47631 0.2328 8	0.60776 0.0825 9	-0.02594 0.9472 9	0.70785 0.0329 9	0.63095 0.0684 9	0.45399 0.3062 7	0.55669 0.1518 8	0.52420 0.1474 9	0.91890 0.0005 9	0.31237 0.4131 9	0.67302 0.0975 Y(7)	0.11889 0.7792 8	0.58820 0.0957 9	1.00000 0.0000 9

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                         CORRELATION ANALYSIS OF CIC DATA C VS F VS T BY CITY SEASON
                                         CITY=WI    SEASON=WINT

                        CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

           MASSDICC    ASDICC    CRDICC    PBDICC      DATE   SO4DICC  MASSDICF    ASDICF    CRDICF    PBDICF   SO4DICF  MASSDICT    ASDICT    CRDICT    PBDICT   SO4DICT

MASSDICC    1.00000  -0.77015   0.20465   0.21423  -0.15609  -0.02132   0.50555   0.80758   0.17900   0.35642  -0.20973   0.85819   0.84664   0.32962   0.39234  -0.21049
             0.0000    0.2298    0.6269    0.5799    0.6667    0.9600    0.1360    0.1924    0.6715    0.3464    0.6181    0.0015    0.1534    0.4253    0.2963    0.6168
                 10         4         8         9        10         8        10         4         8         9         8        10         4         8         9         8

ASDICC     -0.77015   1.00000   0.94626  -0.50120   0.68950  -0.87362  -0.45782  -0.99814  -0.90791  -0.56644  -0.09903  -0.64719  -0.31383   0.53225  -0.54589  -0.30890
             0.2298    0.0000    0.2097    0.4988    0.3105    0.1264    0.5422    0.0019    0.2754    0.4336    0.9010    0.3528    0.6862    0.6427    0.4541    0.6911
                  4         4         3         4         4         4         4         4         3         4         4         4         4         3         4         4

CRDICC      0.20465   0.94626   1.00000  -0.17613  -0.25234  -0.48371  -0.32490  -0.92672  -0.36658  -0.08136  -0.21852  -0.07409  -0.17434   0.80809  -0.24571  -0.36951
             0.6269    0.2097    0.0000    0.6765    0.5466    0.2714    0.4323    0.2452    0.3718    0.8481    0.6378    0.8616    0.8884    0.0152    0.5575    0.4146
                  8         3         8         8         8         7         8         3         8         8         7         8         3  Y(3)   8         8         7

PBDICC      0.21423  -0.50120  -0.17613   1.00000   0.59876   0.23192   0.73368   0.54203   0.28882   0.92602   0.01799   0.57617   0.80745   0.00551   0.89549   0.07114
             0.5799    0.4988    0.6765    0.0000    0.0885    0.5805    0.0245    0.4580    0.4878    0.0003    0.9663    0.1044    0.1925    0.9897    0.0011    0.8671
                  9         4         8         9         9         8         9         4         8         9         8         9         4         8         9         8

DATE       -0.15609   0.68950  -0.25234   0.59876   1.00000  -0.25295   0.67969  -0.65018  -0.17433   0.61383  -0.08454   0.31795   0.37582  -0.36957   0.65353  -0.14121
             0.6667    0.3105    0.5466    0.0885    0.0000    0.5456    0.0306    0.3498    0.6797    0.0787    0.8422    0.3706    0.6242    0.3676    0.0563    0.7387
                 10         4         8         9        10         8        10         4         8         9         8        10         4         8         9         8

SO4DICC    -0.02132  -0.87362  -0.48371   0.23192  -0.25295   1.00000   0.04341   0.84459   0.49971   0.26032  -0.03076   0.01116  -0.15250  -0.19709   0.10106   0.20053
             0.9600    0.1264    0.2714    0.5805    0.5456    0.0000    0.9187    0.1554    0.2535    0.5335    0.9424    0.9791    0.8475    0.6719    0.8118    0.6340
                  8         4         7         8         8         8         8         4         7         8         8         8         4         7         8         8

MASSDICF    0.50555  -0.45782  -0.32490   0.73368   0.67969   0.04341   1.00000   0.50003   0.19537   0.83931   0.04040   0.87675   0.81412  -0.20936   0.91060   0.04961
             0.1360    0.5422    0.4323    0.0245    0.0306    0.9187    0.0000    0.5000    0.6429    0.0047    0.9243    0.0009    0.1859    0.6188    0.0006    0.9071
                 10         4         8         9        10         8        10         4         8         9         8        10         4         8         9         8

ASDICF      0.80758  -0.99814  -0.92672   0.54203  -0.65018   0.84459   0.50003   1.00000   0.92990   0.60135   0.07748   0.68889   0.37113  -0.48414   0.58281   0.28125
             0.1924    0.0019    0.2452    0.4580    0.3498    0.1554    0.5000    0.0000    0.2398    0.3986    0.9225    0.3111    0.6289    0.6783    0.4172    0.7188
                  4         4         3         4         4         4         4         4         3         4         4         4         4         3         4         4

CRDICF      0.17900  -0.90791  -0.36658   0.28882  -0.17433   0.49971   0.19537   0.92990   1.00000   0.14165   0.15961   0.21695   0.80584   0.25178   0.06439   0.31126
             0.6715    0.2754    0.3718    0.4878    0.6797    0.2535    0.6429    0.2398    0.0000    0.7379    0.7325    0.6058    0.4034    0.5475    0.8796    0.4968
                  8         3         8         8         8         7         8         3         8         8         7         8         3         8         8         7

PBDICF      0.35642  -0.56644  -0.08136   0.92602   0.61383   0.26032   0.83931   0.60135   0.14165   1.00000  -0.12491   0.72020   0.73772   0.01129   0.92259  -0.06238
             0.3464    0.4336    0.8481    0.0003    0.0787    0.5335    0.0047    0.3986    0.7379    0.0000    0.7682    0.0286    0.2623    0.9738    0.0004    0.9833
                  9         4         8         9         9         8         9         4         8         9         8         9         4         8         9         8

SO4DICF    -0.20973  -0.09903  -0.21852   0.01799  -0.08454  -0.03076   0.04040   0.07748   0.15961  -0.12491   1.00000  -0.10756  -0.30155  -0.13134   0.08581   0.97306
             0.6181    0.9010    0.6378    0.9663    0.8422    0.9424    0.9243    0.9225    0.7325    0.7682    0.0000    0.7999    0.6984    0.7789    0.8399    0.0001
                  8         4         7         8         8         8         8         4         7         8         8         8         4         7         8         8

MASSDICT    0.85819  -0.64719  -0.07409   0.57617   0.31795   0.01116   0.87675   0.68889   0.21695   0.72020  -0.10756   1.00000   0.87108   0.06515   0.78352  -0.10285
             0.0015    0.3528    0.8616    0.1044    0.3706    0.9791    0.0009    0.3111    0.6058    0.0286    0.7999    0.0000    0.1289    0.8782    0.0125    0.8085
                 10         4         8         9        10         8        10         4         8         9         8        10         4         8         9         8

ASDICT      0.84664  -0.31380  -0.17434   0.80745   0.37582  -0.15250   0.81412   0.37113   0.80584   0.73772  -0.30156   0.87108   1.00000   0.48379   0.76198  -0.32465
             0.1534    0.6862    0.8884    0.1926    0.6242    0.8475    0.1859    0.6289    0.4034    0.2623    0.6984    0.1289    0.0000    0.6785    0.2380    0.6754
                  4         4         3         4         4         4         4         4         3         4         4         4         4         3         4         4

CRDICT      0.32962   0.53225   0.80809   0.00551  -0.36957  -0.19709  -0.20936  -0.48414   0.25178   0.01129  -0.13134   0.06515   0.48379   1.00000  -0.20882  -0.19563
             0.4253    0.6427    0.0152    0.9897    0.3676    0.6719    0.6188    0.6783    0.5475    0.9788    0.7789    0.8782    0.6785    0.0000    0.6197    0.6742
                  8         3         8         8         8         7         8         3         8         8         7         8         3         8         8         7

PBDICT      0.39234  -0.54584  -0.24571   0.89549   0.65353   0.10106   0.91060   0.58281   0.06439   0.92259   0.08581   0.78352   0.76198  -0.20882   1.00000   0.10742
             0.2963    0.4541    0.5573    0.0011    0.0563    0.8118    0.0006    0.4172    0.8796    0.0004    0.8399    0.0125    0.2380    0.6197    0.0000    0.8001
                  9         4         8         9         9         8         9         4         8         9         8         9         4         8         9         8

SO4DICT    -0.21049  -0.30890  -0.36951   0.07114  -0.14121   0.20053   0.04961   0.28125   0.31126  -0.06238   0.97306  -0.10285  -0.32465  -0.19563   0.10742   1.00000
             0.6168    0.6911    0.4146    0.8671    0.7387    0.6340    0.9071    0.7188    0.4968    0.8833    0.0001    0.8085    0.6754    0.6742    0.8001    0.0000
                  8         4         7         8         8         8         8         4         7         8         8         8      Y(4)         7         8         8
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                    CORRELATION ANALYSIS OF DIC DATA COARSE VS FINE VS TOTAL BY CITY
                                                 CITY=ED

                    CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

            MASSDICC    ASDICC    CRDICC    PBDICC      DATE  SO4DICC  MASSDICF    ASDICF    CRDICF    PBDICF  SO4DICF  MASSDICT    ASDICT    CRDICT    PBDICT   SO4DICT

MASSDICC     1.00000  -0.25398   0.19436   0.49693  -0.47308  -0.33528   0.04916   0.40129   0.24382   0.45474  -0.31362   0.94766   0.12189   0.23656   0.47616  -0.38394
              0.0000    0.4789    0.4253    0.0258    0.0262    0.1883    0.9280    0.2504    0.3145    0.0440    0.2203    0.0001    0.7373    0.3295    0.0336    0.1231
                  22        10        19        20        22        17        22        10        19        20        17        22        10        19        20        17

ASDICC      -0.25398   1.00000  -0.32507  -0.26510  -0.49970  -0.24037  -0.46514  -0.71393  -0.20639  -0.19756  -0.23593  -0.31826   0.59431  -0.26299  -0.21555  -0.23302
              0.4789    0.0000    0.3594    0.4592    0.1414    0.6036    0.1755    0.0204    0.5673    0.5843    0.6105    0.3701    0.0700    0.4292    0.5493    0.6151
                  10        10        10        10        10         7        10        10        10        10         7        10        10        10        10         7

CRDICC       0.19436  -0.32507   1.00000  -0.42047  -0.38196  -0.39096  -0.37292   0.22365   0.74488  -0.30565  -0.28193   0.06102  -0.23510   0.92614  -0.33919  -0.34288
              0.4253    0.3594    0.0000    0.0730    0.1066    0.1343    0.1158    0.5345    0.0003    0.2032    0.2901    0.8040    0.5132    0.0001    0.1554    0.1936
                  19        10        19        19        19        16        19        10        19        19        16        19     Y(10)        19        19        16

PBDICC       0.49693  -0.26510  -0.42047   1.00000   0.16642  -0.30657   0.39280   0.44833  -0.29185   0.83953   0.07343   0.57042   0.16940  -0.37724   0.89669  -0.00799
              0.0258    0.4592    0.0730    0.0000    0.4831    0.2314    0.0867    0.1938    0.2254    0.0001    0.7794    0.0086    0.6399    0.1113    0.0001    0.9757
                  20        10        19        20        20        17        20        10        19        20        17        20        10        19        20        17

DATE        -0.47308  -0.49970  -0.38196   0.16642   1.00000   0.40044   0.42521   0.35695  -0.37523  -0.03625   0.08076  -0.30675  -0.28841  -0.40531   0.00590   0.17679
              0.0262    0.1414    0.1066    0.4831    0.0000    0.1112    0.0485    0.3113    0.1134    0.8794    0.7580    0.1650    0.4190    0.0852    0.9803    0.4973
                  22        10        19        20        23        17        22        10        19        20        17        22        10        19        20        17

SO4DICC     -0.33528  -0.24037  -0.39096  -0.30657   0.40044   1.00000   0.20794   0.02938  -0.42521  -0.32588   0.08015  -0.24571  -0.27595  -0.42499  -0.33042   0.30620
              0.1883    0.6036    0.1343    0.2314    0.1112    0.0000    0.4232    0.9501    0.1006    0.2018    0.7598    0.3418    0.5492    0.1008    0.1952    0.2320
                  17         7        16        17        17        17        17         7        16        17        17        17         7        16        17        17

MASSDICF     0.04916  -0.46514  -0.37292   0.39280   0.42521   0.20794   1.00000   0.39360  -0.32523   0.44647   0.04419   0.36543  -0.18997  -0.37269   0.44733   0.08824
              0.9280    0.1755    0.1158    0.0867    0.0485    0.4232    0.0000    0.2604    0.1742    0.0485    0.8663    0.0944    0.5991    0.1161    0.0480    0.7363
                  22        10        19        20        22        17        22        10        19        20        17        22        10        19        20        17

ASDICF       0.40129  -0.71393   0.22365   0.44833   0.35695   0.02938   0.39360   1.00000   0.13622   0.24496  -0.16372   0.42909   0.13739   0.19137   0.29284  -0.16091
              0.2504    0.0204    0.5345    0.1938    0.3113    0.9501    0.2604    0.0000    0.7075    0.4952    0.7258    0.2159    0.7051    0.5964    0.4116    0.7304
                  10        10        10        10        10         7        10        10        10        10         7        10        10        10        10         7

CRDICF       0.24382  -0.20639   0.74488  -0.29185  -0.37523  -0.42521  -0.32523   0.13622   1.00000  -0.14277  -0.27181   0.12015  -0.15877   0.94151  -0.17885  -0.34290
              0.3145    0.5673    0.0003    0.2254    0.1134    0.1006    0.1742    0.7075    0.0000    0.5598    0.3085    0.6242    0.6613    0.0001    0.4638    0.1935
                  19        10        19        19        19        16        19        10        19        19        16        19        10        19        19        16

PBDICF       0.45474  -0.19756  -0.30565   0.83953  -0.03625  -0.32588   0.44647   0.24496  -0.14277   1.00000  -0.05875   0.54878   0.02267  -0.23479   0.99330  -0.14008
              0.0440    0.5843    0.2032    0.0001    0.8794    0.2018    0.0485    0.4952    0.5598    0.0000    0.8228    0.0122    0.9504    0.3333    0.0001    0.5918
                  20        10        19        20        20        17        20        10        19        20        17        20        10        19        20        17

SO4DICF     -0.31362  -0.23593  -0.28193   0.07343   0.08076   0.08015   0.04419  -0.16372  -0.27181  -0.05875   1.00000  -0.27380  -0.47526  -0.28808  -0.03311   0.97327
              0.2203    0.6105    0.2901    0.7794    0.7580    0.7598    0.8663    0.7258    0.3085    0.8228    0.0000    0.2876    0.2811    0.2793    0.8996    0.0001
                  17         7        16        17        17        17        17         7        16        17        17        17         7        16        17        17

MASSDICT     0.94766  -0.31826   0.06102   0.57042  -0.30675  -0.24571   0.36543   0.42909   0.12015   0.54878  -0.27380   1.00000   0.06347   0.09910   0.56842  -0.32529
              0.0001    0.3701    0.8040    0.0086    0.1650    0.3418    0.0944    0.2159    0.6242    0.0122    0.2876    0.0000    0.8617    0.6865    0.0089    0.2027
                  22        10        19        20        22        17        22        10        19        20        17        22        10        19        20        17

ASDICT       0.12189   0.59431  -0.23510   0.16940  -0.28841  -0.27596  -0.18997   0.13739  -0.15877   0.02267  -0.47526   0.06347   1.00000  -0.21001   0.05445  -0.46823
              0.7373    0.0700    0.5132    0.6399    0.4190    0.5492    0.5991    0.7051    0.6613    0.9504    0.2811    0.8617    0.0000    0.5603    0.8812    0.2893
                  10        10        10        10        10         7        10        10        10        10         7        10        10        10        10         7

CRDICT       0.23656  -0.26299   0.92614  -0.37724  -0.40531  -0.42499  -0.37269   0.19137   0.94151  -0.23479  -0.28808   0.09910  -0.21001   1.00000  -0.27216  -0.35700
              0.3245    0.4292    0.0001    0.1113    0.0852    0.1009    0.1161    0.5964    0.0001    0.3333    0.2793    0.6865    0.5603    0.0000    0.2596    0.1747
                  19        10        19        19        19        16        19        10        19        19        16        19        10        19        19        15

PBDICT       0.47616  -0.21555  -0.33919   0.89669   0.00590  -0.33042   0.44733   0.29284  -0.17885   0.99330  -0.03311   0.56842   0.05445  -0.27216   1.00000  -0.11659
              0.0336    0.5493    0.1554    0.0001    0.9803    0.1952    0.0480    0.4116    0.4638    0.0001    0.8996    0.0089    0.8812    0.2596    0.0000    0.6559
                  20        10        19        20        20        17        20        10        19        20        17        20        10        19        20        17

SO4DICT     -0.38394  -0.23302  -0.34288  -0.00799   0.17679   0.30620   0.08824  -0.16091  -0.34290  -0.14008   0.97327  -0.32529  -0.46823  -0.35700  -0.11659   1.00000
              0.1231    0.6151    0.1936    0.9757    0.4973    0.2320    0.7363    0.7304    0.1935    0.5918    0.0001    0.2027    0.2893    0.1747    0.6559    0.0000
                  17         7        16        17        17        17        17         7        16        17        17        17      Y(7)        16        17        17
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                         CORRELATION ANALYSIS OF CIC DATA C VS F VS T BY CITY SEASON
                                         CITY=ED   SEASON=FALL

                      CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

             MASSDICC     ASDICC     CRDICC     PBDICC       DATE    SO4DICC   MASSDICF     ASDICF     CRDICF     PBDICF    SO4DICF   MASSDICT     ASDICT     CRDICT     PBDICT    SO4DICT

MASSDICC      1.00000   -0.25398    0.03135    0.75409   -0.06960   -0.20933    0.55718    0.40129    0.15877    0.71994   -0.46560    0.98365    0.12189    0.10569    0.74511   -0.49269
               0.0000     0.4799     0.9229     0.0046     0.8212     0.5888     0.0479     0.2504     0.6221     0.0083     0.2066     0.0001     0.7373     0.7437     0.0054     0.1778
                   13         10         12         12         13          9         13         10         12         12          9         13         10         12         12          9

ASDICC       -0.25398    1.00000   -0.32507   -0.26510   -0.49970   -0.24037   -0.46514   -0.71393   -0.20639   -0.19756   -0.23593   -0.31826    0.59431   -0.28299   -0.21555   -0.23302
               0.4799     0.0000     0.3594     0.4592     0.1414     0.6036     0.1755     0.0204     0.5673     0.5843     0.6105     0.3701     0.0700     0.4282     0.5499     0.6151
                   10         10         10         10         10          7         10         10         10         10          7         10         10         10         10          7

CRDICC        0.03136   -0.32507    1.00000   -0.45609   -0.10949   -0.38113   -0.42880    0.22365    0.73630   -0.36997   -0.40316   -0.06594   -0.23510    0.92585   -0.39767   -0.44893
               0.9229     0.3594     0.0000     0.1362     0.7348     0.3115     0.1643     0.5345     0.0063     0.2365     0.2820     0.8387     0.5132     0.0001     0.2005     0.2255
                   12         10         12         12         12          9         12         10         12         12          9         12         10         12         12          9

PBDICC        0.75408   -0.26510   -0.45609    1.00000    0.32491   -0.09916    0.83423    0.44833   -0.30086    0.85591   -0.03463    0.82942    0.16940   -0.40237    0.90811   -0.05744
               0.0046     0.4592     0.1362     0.0000     0.3028     0.7996     0.0007     0.1938     0.3420     0.0004     0.9295     0.0008     0.6399     0.1947     0.0001     0.8833
                   12         10         12         12         12          9         12         10         12         12          9         12         10         12         12          9

DATE         -0.06960   -0.49970   -0.10949    0.32491    1.00000   -0.12990    0.21115    0.35695   -0.14333    0.02014    0.52670   -0.01438   -0.28841   -0.13673    0.08623    0.49279
               0.8212     0.1414     0.7348     0.3028     0.0000     0.7391     0.4886     0.3113     0.6567     0.9505     0.1452     0.9628     0.4190     0.6718     0.7899     0.1777
                   13         10         12         12         13          9         13         10         12         12          9         13         10         12         12          9

SO4DICC      -0.20933   -0.24037   -0.38113   -0.09916   -0.12990    1.00000   -0.04966    0.02938   -0.38853   -0.07196    0.09614   -0.19318   -0.27595   -0.39790   -0.07919    0.25378
               0.5888     0.6036     0.3115     0.7996     0.7391     0.0000     0.8990     0.9501     0.3014     0.8540     0.8056     0.6185     0.5492     0.2889     0.8395     0.5100
                    9          7          9          9          9          9          9          7          9          9          9          9          7          9          9          9

MASSDICF      0.55719   -0.46514   -0.42880    0.83423    0.21115   -0.04966    1.00000    0.39360   -0.18843    0.85063    0.19765    0.69762   -0.18997   -0.32619    0.86820    0.17496
               0.0479     0.1755     0.1643     0.0007     0.4886     0.8990     0.0000     0.2604     0.5575     0.0005     0.6102     0.0080     0.5991     0.3008     0.0002     0.6525
                   13         10         12         12         13          9         13         10         12         12          9         13         10         12         12          9

ASDICF        0.40129   -0.71393    0.22365    0.44833    0.35695    0.02938    0.39360    1.00000    0.13622    0.24496   -0.16372    0.42909    0.13739    0.19137    0.29284   -0.16091
               0.2504     0.0204     0.5345     0.1938     0.3113     0.9501     0.2604     0.0000     0.7075     0.4952     0.7258     0.2159     0.7051     0.5964     0.4116     0.7304
                   10         10         10         10         10          7         10         10         10         10          7         10         10         10         10          7

CRDICF        0.15877   -0.20639    0.73630   -0.30086   -0.14333   -0.38853   -0.18843    0.13622    1.00000   -0.14403   -0.44253    0.09576   -0.15877    0.93740   -0.18131   -0.49202
               0.6221     0.5673     0.0063     0.3420     0.6567     0.3014     0.5575     0.7075     0.0000     0.6552     0.2329     0.7672     0.6613     0.0001     0.5728     0.1785
                   12         10         12         12         12          9         12         10         12         12          9         12         10         12         12          9

PBDICF        0.71994   -0.19756   -0.36997    0.85591    0.02014   -0.07196    0.85063    0.24496   -0.14403    1.00000   -0.22479    0.80370    0.02267   -0.27049    0.99380   -0.23814
               0.0083     0.5843     0.2365     0.0004     0.9505     0.8540     0.0005     0.4952     0.6552     0.0000     0.5609     0.0016     0.9504     0.3952     0.0001     0.5372
                   12         10         12         12         12          9         12         10         12         12          9         12         10         12         12          9

SO4DICF      -0.46560   -0.23593   -0.40316   -0.03463    0.52670    0.09614    0.19765   -0.16372   -0.44253   -0.22479    1.00000   -0.35476   -0.47525   -0.43991   -0.18996    0.98704
               0.2066     0.6105     0.2820     0.9295     0.1452     0.8056     0.6102     0.7258     0.2329     0.5609     0.0000     0.3489     0.2811     0.2361     0.6245     0.0001
                    9          7          9          9          9          9          9          7          9          9          9          9          7          9          9          9

MASSDICT      0.98365   -0.31826   -0.06594    0.82942   -0.01438   -0.19318    0.69762    0.42909    0.09576    0.80370   -0.35476    1.00000    0.06347    0.02024    0.82913   -0.38366
               0.0001     0.3701     0.8387     0.0008     0.9628     0.6185     0.0080     0.2159     0.7672     0.0016     0.3489     0.0000     0.8617     0.9502     0.0009     0.3080
                   13         10         12         12         13          9         13         10         12         12          9         13         10         12         12          9

ASDICT        0.12188    0.59431   -0.23510    0.16940   -0.28841   -0.27596   -0.18997    0.13739   -0.15877    0.02267   -0.47526    0.06347    1.00000   -0.21001    0.05445   -0.46823
               0.7373     0.0700     0.5132     0.6399     0.4190     0.5492     0.5991     0.7051     0.6613     0.9504     0.2811     0.8617     0.0000     0.5603     0.8812     0.2893
                   10         10         10         10         10          7         10         10         10         10          7         10         10         10         10          7

CRDICT        0.10569   -0.28299    0.92585   -0.40237   -0.13673   -0.39790   -0.32619    0.19137    0.93740   -0.27049   -0.43991    0.02024   -0.21001    1.00000   -0.30555   -0.48915
               0.7437     0.4282     0.0001     0.1947     0.6718     0.2889     0.3008     0.5964     0.0001     0.3952     0.2361     0.9502     0.5603     0.0000     0.3341     0.1814
                   12         10         12         12         12          9         12         10         12         12          9         12         10         12         12          9

PBDICT        0.74511   -0.21555   -0.39767    0.90811    0.08623   -0.07919    0.86820    0.29284   -0.18131    0.99380   -0.18996    0.82913    0.05445   -0.30555    1.00000   -0.20558
               0.0054     0.5499     0.2005     0.0001     0.7899     0.8395     0.0002     0.4116     0.5728     0.0001     0.6245     0.0009     0.8812     0.3341     0.0000     0.5957
                   12         10         12         12         12          9         12         10         12         12          9         12         10         12         12          9

SO4DICT      -0.49269   -0.23302   -0.44893   -0.05744    0.49279    0.25378    0.17496   -0.16091   -0.49202   -0.23814    0.98704   -0.38366   -0.46823   -0.48915   -0.20558    1.00000
               0.1778     0.6151     0.2255     0.8833     0.1777     0.5100     0.6525     0.7304     0.1785     0.5372     0.0001     0.3080     0.2893     0.1814     0.5957     0.0000
                    9          7          9          9          9          9          9          7          9          9          9          9          7          9          9          9
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                          CORRELATION ANALYSIS OF DIC DATA COARSE VS FINE VS TOTAL BY CITY
                                                     CITY=VA

                     CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

           MASSDICC    ASDICC    CRDICC    PBDICC      DATE   SO4DICC  MASSDICF    ASDICF    CRDICF    PBDICF   SO4DICF  MASSDICT    ASDICT    CRDICT    PBDICT   SO4DICT

MASSDICC    1.00000   0.15107  -0.49414   0.88406  -0.58351   0.23363   0.75939  -0.19414   0.31099   0.89345   0.68271   0.91300  -0.06953   0.20522   0.92094   0.68113
             0.0000    0.6575    0.0861    0.0001    0.0139    0.4020    0.0004    0.5673    0.3010    0.0001    0.0050    0.0001    0.8390    0.5012    0.0001    0.0052
                 17        11        13        15        17        15        17        11        13        15        15        17        11        13        15        15

ASDICC      0.15107   1.00000   0.13629  -0.13191  -0.72286  -0.14105  -0.09742  -0.14530  -0.25196  -0.01523   0.08561  -0.00101   0.53817  -0.23333  -0.04131   0.03670
             0.6575    0.0000    0.7266    0.6990    0.0120    0.6791    0.7757    0.6699    0.5131    0.9645    0.8024    0.9976    0.0877    0.5457    0.9029    0.9147
                 11        11         9        11        11        11        11        11         9        11        11        11        11         9        11        11

CRDICC     -0.49414   0.13629   1.00000  -0.43782   0.41655   0.17688  -0.61422   0.76195  -0.35207  -0.70320  -0.53762  -0.60133   0.76068  -0.12348  -0.67011  -0.42105
             0.0861    0.7266    0.0000    0.1346    0.1568    0.5632    0.0255    0.0170    0.2381    0.0073    0.0581    0.0297    0.0173    0.6878    0.0122    0.1519
                 13         9        13        13        13        13        13         9        13        13        13        13         9 Y(?)   13        13        13

PBDICC      0.88406  -0.13191  -0.43782   1.00000  -0.32149   0.48283   0.67206  -0.28368   0.17516   0.80856   0.61148   0.81001  -0.33271   0.07535   0.87619   0.69990
             0.0001    0.6990    0.1346    0.0000    0.2426    0.0683    0.0061    0.3975    0.5671    0.0003    0.0154    0.0003    0.3174    0.8067    0.0001    0.0037
                 15        11        13        15        15        15        15        11        13        15        15        15        11        13        15        15

DATE       -0.58351  -0.72286   0.41655  -0.32149   1.00000  -0.02371  -0.40904   0.41965  -0.17409  -0.43667  -0.39512  -0.51109  -0.12400  -0.07925  -0.42644  -0.35602
             0.0139    0.0120    0.1568    0.2426    0.0000    0.9332    0.1030    0.1988    0.5695    0.1036    0.1449    0.0360    0.7164    0.7969    0.1129    0.1923
                 17        11        13        15        17        15        17        11        13        15        15        17        11        13        15        15

SO4DICC     0.23363  -0.14105   0.17688   0.48283  -0.02371   1.00000   0.21278  -0.26265   0.15665   0.14280   0.19894   0.23683  -0.31597   0.20900   0.22028   0.49675
             0.4020    0.6791    0.5632    0.0683    0.9332    0.0000    0.4464    0.4352    0.6093    0.6117    0.4772    0.3954    0.3439    0.4932    0.4302    0.0596
                 15        11        13        15        15        15        15        11        13        15        15        15        11        13        15        15

MASSDICF    0.75939  -0.09742  -0.61422   0.67206  -0.40904   0.21278   1.00000  -0.28593   0.74409   0.87726   0.80603   0.95876  -0.30829   0.63520   0.86230   0.78169
             0.0004    0.7757    0.0255    0.0061    0.1030    0.4464    0.0000    0.3940    0.0035    0.0001    0.0003    0.0001    0.3563    0.0197    0.0001    0.0006
                 17        11        13        15        17        15        17        11        13        15        15        17        11        13        15        15

ASDICF     -0.19414  -0.14530   0.76195  -0.28368   0.41965  -0.26265  -0.28593   1.00000  -0.22396  -0.29725  -0.32549  -0.26694   0.75551  -0.06153  -0.30751  -0.27577
             0.5673    0.6699    0.0170    0.3975    0.1988    0.4352    0.3940    0.0000    0.5624    0.3747    0.3287    0.4275    0.0072    0.8750    0.3576    0.2547
                 11        11         9        11        11        11        11        11         9        11        11        11        11         9        11        11

CRDICF      0.31099  -0.25196  -0.35207   0.17516  -0.17409   0.15665   0.74409  -0.22396   1.00000   0.46486   0.41542   0.59790  -0.37230   0.97228   0.41813   0.41288
             0.3010    0.5131    0.2381    0.5671    0.5695    0.6093    0.0035    0.5624    0.0000    0.1095    0.1580    0.0309    0.3238    0.0001    0.1551    0.1609
                 13         9        13        13        13        13        13         9        13        13        13        13         9        13        13        13

PBDICF      0.89345  -0.01523  -0.70320   0.80856  -0.43667   0.14280   0.87726  -0.29725   0.46486   1.00000   0.79391   0.93943  -0.26399   0.31671   0.99205   0.74890
             0.0001    0.9645    0.0073    0.0003    0.1036    0.6117    0.0001    0.3747    0.1095    0.0000    0.0004    0.0001    0.4328    0.2917    0.0001    0.0013
                 15        11        13        15        15        15        15        11        13        15        15        15        11        13        15        15

SO4DICF     0.68271   0.08561  -0.53762   0.61148  -0.39512   0.19894   0.80603  -0.32549   0.41542   0.79391   1.00000   0.80104  -0.21496   0.30575   0.78109   0.94924
             0.0050    0.8024    0.0581    0.0154    0.1449    0.4772    0.0003    0.3287    0.1580    0.0004    0.0000    0.0003    0.5256    0.3097    0.0006    0.0001
                 15        11        13        15        15        15        15        11        13        15        15        15        11        13        15        15

MASSDICT    0.91300  -0.00101  -0.60133   0.81001  -0.51109   0.23683   0.95876  -0.26694   0.59790   0.93943   0.80104   1.00000  -0.22994   0.48304   0.94275   0.78586
             0.0001    0.9976    0.0297    0.0003    0.0360    0.3954    0.0001    0.4275    0.0309    0.0001    0.0003    0.0000    0.4964    0.0945    0.0001    0.0005
                 17        11        13        15        17        15        17        11        13        15        15        17        11        13        15        15

ASDICT     -0.06953   0.53817   0.76068  -0.33271  -0.12400  -0.31597  -0.30829   0.75551  -0.37230  -0.26399  -0.21496  -0.22994   1.00000  -0.21745  -0.29103  -0.29063
             0.8390    0.0877    0.0173    0.3174    0.7164    0.3439    0.3563    0.0072    0.3238    0.4328    0.5256    0.4964    0.0000    0.5741    0.3853    0.3859
                 11        11         9        11        11        11        11        11         9        11        11        11        11         9        11        11

CRDICT      0.20522  -0.23333  -0.12348   0.07535  -0.07925   0.20900   0.63520  -0.06153   0.97228   0.31671   0.30575   0.48304  -0.21745   1.00000   0.27530   0.33181
             0.5012    0.5457    0.6878    0.8067    0.7969    0.4932    0.0197    0.8750    0.0001    0.2917    0.3097    0.0945    0.5741    0.0000    0.3626    0.2681
                 13         9        13        13        13        13        13         9        13        13        13        13         9        13        13        13

PBDICT      0.92094  -0.04131  -0.67011   0.87619  -0.42644   0.22028   0.86230  -0.30751   0.41813   0.99205   0.78109   0.94275  -0.29103   0.27530   1.00000   0.76315
             0.0001    0.9029    0.0122    0.0001    0.1129    0.4302    0.0001    0.3576    0.1551    0.0001    0.0006    0.0001    0.3853    0.3626    0.0000    0.0009
                 15        11        13        15        15        15        15        11        13        15        15        15        11        13        15        15

SO4DICT     0.68113   0.03670  -0.42105   0.69990  -0.35602   0.49675   0.78169  -0.27577   0.41288   0.74890   0.94924   0.78586  -0.29063   0.33181   0.76315   1.00000
             0.0052    0.9147    0.1519    0.0037    0.1923    0.0596    0.0006    0.2547    0.1609    0.0013    0.0001    0.0005    0.3859    0.2681    0.0009    0.0000
                 15        11        13        15        15        15        15        11        13        15        15        15        11 YC     13        15        15
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                           CORRELATION ANALYSIS OF CIC DATA C VS F VS T BY CITY SEASON                                        660
                                                CITY=ED   SEASON=FALL

                           CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

            MASSDICC    ASDICC    CRDICC    PBDICC      DATE   SO4DICC  MASSDICF    ASDICF    CRDICF    PBDICF   SO4DICF  MASSDICT    ASDICT    CRDICT    PBDICT   SO4DICT

MASSDICC     1.00000  -0.25398   0.03136   0.75409  -0.06960  -0.20933   0.55718   0.40129   0.15877   0.71994  -0.46560   0.98365   0.12188   0.10569   0.74511  -0.49269
              0.0000    0.4799    0.9229    0.0046    0.8712    0.5888    0.0479    0.2504    0.6221    0.0083    0.2066    0.0001    0.7373    0.7437    0.0054    0.1778
                  13        10        12        12        13         9        13        10        12        12         9        13        10        12        12         9

ASDICC      -0.25398   1.00000  -0.32507  -0.26510  -0.49970  -0.24037  -0.46514  -0.71393  -0.20639  -0.19756  -0.23593  -0.31826   0.59431  -0.28299  -0.21555  -0.23302
              0.4799    0.0000    0.3594    0.4592    0.1414    0.6036    0.1755    0.0204    0.5673    0.5843    0.6105    0.3701    0.0700    0.4282    0.5499    0.6151
                  10        10        10        10        10         7        10        10        10        10         7        10        10        10        10         7

CRDICC       0.03136  -0.32507   1.00000  -0.45609  -0.10949  -0.38113  -0.42880   0.22365   0.73630  -0.36997  -0.40316  -0.06594  -0.23510   0.92585  -0.39757  -0.44893
              0.9229    0.3594    0.0000    0.1362    0.7348    0.3115    0.1643    0.5345    0.0063    0.2365    0.2820    0.8387    0.5132    0.0001    0.2005    0.2255
                  12        10        12        12        12         9        12        10        12        12         9        12        10        12        12         9

PBDICC       0.75408  -0.26510  -0.45609   1.00000   0.32491  -0.09916   0.83423   0.44833  -0.30086   0.85591  -0.03463   0.82942   0.16940  -0.40237   0.90811  -0.05744
              0.0046    0.4592    0.1362    0.0000    0.3028    0.7996    0.0007    0.1938    0.3420    0.0004    0.9295    0.0008    0.6399    0.1947    0.0001    0.8833
                  12        10        12        12        12         9        12        10        12        12         9        12        10        12        12         9

DATE        -0.06960  -0.49970  -0.10949   0.32491   1.00000  -0.12990   0.21115   0.35695  -0.14333   0.02014   0.52670  -0.01438  -0.28841  -0.13673   0.08623   0.49279
              0.8212    0.1414    0.7348    0.3028    0.0000    0.7391    0.4886    0.3113    0.6567    0.9505    0.1452    0.9628    0.4190    0.6718    0.7899    0.1777
                  13        10        12        12        13         9        13        10        12        12         9        13        10        12        12         9

SO4DICC     -0.20933  -0.24037  -0.38113  -0.09916  -0.12990   1.00000  -0.04966   0.02938  -0.38853  -0.07196   0.09614  -0.19318  -0.27596  -0.39790  -0.07919   0.25378
              0.5888    0.6036    0.3115    0.7996    0.7391    0.0000    0.8990    0.9501    0.3014    0.8540    0.8056    0.6185    0.5492    0.2889    0.8395    0.5100
                   9         7         9         9         9         9         9         7         9         9         9         9         7         9         9         9

MASSDICF     0.55718  -0.46514  -0.42880   0.83423   0.21115  -0.04966   1.00000   0.39360  -0.18843   0.85063   0.19765   0.69762  -0.18997  -0.32619   0.86820   0.17496
              0.0479    0.1755    0.1643    0.0007    0.4886    0.8990    0.0000    0.2604    0.5575    0.0005    0.6102    0.0080    0.5991    0.3008    0.0002    0.6525
                  13        10        12        12        13         9        13        10        12        12         9        13        10        12        12         9

ASDICF       0.40129  -0.71393   0.22365   0.44833   0.35695   0.02938   0.39360   1.00000   0.13622   0.24496  -0.16372   0.42909   0.13739   0.19137   0.25284  -0.16091
              0.2504    0.0204    0.5345    0.1938    0.3113    0.9501    0.2604    0.0000    0.7075    0.4952    0.7258    0.2159    0.7051    0.5964    0.4116    0.7304
                  10        10        10        10        10         7        10        10        10        10         7        10        10        10        10         7

CRDICF       0.15877  -0.20639   0.73630  -0.30086  -0.14333  -0.38853  -0.18843   0.13622   1.00000  -0.14403  -0.44253   0.09576  -0.15877   0.93740  -0.18131  -0.49202
              0.6221    0.5673    0.0063    0.3420    0.6567    0.3014    0.5575    0.7075    0.0000    0.6552    0.2329    0.7672    0.6613    0.0001    0.5723    0.1785
                  12        10        12        12        12         9        12        10        12        12         9        12        10        12        12         9

PBDICF       0.71994  -0.19756  -0.36997   0.85591   0.02014  -0.07196   0.85063   0.24496  -0.14403   1.00000  -0.22479   0.80370   0.02267  -0.27049   0.99380  -0.23814
              0.0083    0.5843    0.2365    0.0004    0.9505    0.8540    0.0005    0.4952    0.6552    0.0000    0.5609    0.0016    0.9504    0.3952    0.0001    0.5372
                  12        10        12        12        12         9        12        10        12        12         9        12        10        12        12         9

SO4DICF     -0.46560  -0.23593  -0.40316  -0.03463   0.52670   0.09614   0.19765  -0.16372  -0.44253  -0.22479   1.00000  -0.35476  -0.47525  -0.43991  -0.18996   0.98704
              0.2066    0.6105    0.2820    0.9295    0.1452    0.8056    0.6102    0.7258    0.2329    0.5609    0.0000    0.3489    0.2811    0.2361    0.6245    0.0001
                   9         7         9         9         9         9         9         7         9         9         9         9         7         9         9         9

MASSDICT     0.99365  -0.31826  -0.06594   0.82942  -0.01439  -0.19318   0.69762   0.42909   0.09576   0.80370  -0.35476   1.00000   0.06347   0.02024   0.82913  -0.38366
              0.0001    0.3701    0.8387    0.0008    0.9628    0.6185    0.0080    0.2159    0.7672    0.0016    0.3489    0.0000    0.8617    0.9502    0.0009    0.3090
                  13        10        12        12        13         9        13        10        12        12         9        13        10        12        12         9

ASDICT       0.12188   0.59431  -0.23510   0.16940  -0.28841  -0.27596  -0.18997   0.13739  -0.15877   0.02267  -0.47526   0.06347   1.00000  -0.21001   0.05445  -0.46823
              0.7373    0.0700    0.5132    0.6399    0.4190    0.5492    0.5991    0.7051    0.6613    0.9504    0.2811    0.8617    0.0000    0.5603    0.8812    0.2893
                  10        10        10        10        10         7        10        10        10        10         7        10        10        10        10         7

CRDICT       0.10569  -0.28299   0.92585  -0.40237  -0.13673  -0.39790  -0.32619   0.19137   0.93740  -0.27049  -0.43991   0.02024  -0.21001   1.00000  -0.30555  -0.48915
              0.7437    0.4282    0.0001    0.1947    0.6718    0.2889    0.3008    0.5964    0.0001    0.3952    0.2361    0.9502    0.5603    0.0000    0.3341    0.1814
                  12        10        12        12        12         9        12        10        12        12         9        12        10        12        12         9

PBDICT       0.74511  -0.21555  -0.39767   0.90811   0.08623  -0.07919   0.86820   0.25284  -0.18131   0.99380  -0.18996   0.82913   0.05445  -0.30555   1.00000  -0.20558
              0.0054    0.5499    0.2005    0.0001    0.7899    0.8395    0.0002    0.4116    0.5728    0.0001    0.6245    0.0009    0.8812    0.3341    0.0000    0.5957
                  12        10        12        12        12         9        12        10        12        12         9        12        10        12        12         9

SO4DICT     -0.49269  -0.23302  -0.44893  -0.05744   0.49279   0.25378   0.17496  -0.16091  -0.49202  -0.23814   0.98704  -0.38366  -0.46823  -0.48915  -0.20558   1.00000
              0.1778    0.6151    0.2255    0.8833    0.1777    0.5100    0.6525    0.7304    0.1785    0.5372    0.0001    0.3080    0.2893    0.1814    0.5937    0.0000
                   9         7         9         9         9         9         9         7         9         9         9         9         7         9         9         9
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Y(10)

YC

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                          CORRELATION ANALYSIS OF DIC DATA C VS F VS T BY CITY SEASON
                                         CITY=VA   SEASON=FALL

                     CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

           MASSDICC    ASDICC    CRDICC    PBDICC      DATE   SO4DICC  MASSDICF    ASDICF    CRDICF    PBDICF   SO4DICF  MASSDICT    ASDICT    CRDICT    PBDICT   SO4DICT

MASSDICC    1.00000   0.08320  -0.17540   0.85878  -0.40251   0.20723   0.75714   0.10565   0.08208   0.85327   0.65345   0.90579   0.11219   0.05326   0.89549   0.65911
             0.0000    0.8193    0.6517    0.0007    0.1946    0.5409    0.0044    0.7715    0.8337    0.0008    0.0292    0.0001    0.7575    0.8918    0.0002    0.0274
                 12        10         9        11        12        11        12        10         9        11        11        12        10         9        11        11

ASDICC      0.08320   1.00000   0.48309  -0.20131  -0.74260  -0.19875  -0.20887   0.20615  -0.38875  -0.08905   0.03986  -0.10083   0.88131  -0.30998  -0.11844  -0.02363
             0.8193    0.0000    0.2253    0.5770    0.0139    0.5820    0.5625    0.5677    0.3412    0.8067    0.9129    0.7817    0.0008    0.4549    0.7445    0.9483
                 10        10         8        10        10        10        10        10         8        10        10        10        10         8        10        10

CRDICC     -0.17540   0.48309   1.00000  -0.14109  -0.09104   0.44553  -0.41083   0.49215  -0.17902  -0.56849  -0.52958  -0.35287  -0.62395  -0.00808  -0.50098  -0.32784
             0.6517    0.2253    0.0000    0.7173    0.8158    0.2294    0.2720    0.2154    0.6449    0.1102    0.1426    0.3516    0.0983    0.9835    0.1695    0.3891
                  9         8         9         9         9         9         9         8         9         9         9         9  Y(5)   8         9         9         9

PBDICC      0.85878  -0.20131  -0.14109   1.00000   0.09740   0.51578   0.60322  -0.20892  -0.04014   0.73405   0.57414   0.75872  -0.26316  -0.06555   0.82900   0.68854
             0.0007    0.5770    0.7173    0.0000    0.7757    0.1044    0.0494    0.5624    0.9183    0.0101    0.0647    0.0068    0.4626    0.8669    0.0016    0.0191
                 11        10         9        11        11        11        11        10         9        11        11        11        10         9        11        11

DATE       -0.40251  -0.74260  -0.09104   0.09740   1.00000   0.28616  -0.14476  -0.39756   0.30061  -0.05950  -0.20852  -0.26014  -0.78090   0.28902  -0.02722  -0.09404
             0.1946    0.0139    0.8158    0.7757    0.0000    0.3936    0.6535    0.2553    0.4319    0.8620    0.5384    0.4142    0.0077    0.4507    0.9367    0.7833
                 12        10         9        11        12        11        12        10         9        11        11        12        10         9        11        11

SO4DICC     0.20723  -0.19875   0.44553   0.51578   0.28616   1.00000   0.17837  -0.23343   0.03831   0.10606   0.14706   0.20575  -0.26719   0.11544   0.20318   0.45390
             0.5409    0.5820    0.2294    0.1044    0.3936    0.0000    0.5998    0.5163    0.9221    0.7563    0.6661    0.5439    0.4555    0.7674    0.5490    0.1608
                 11        10         9        11        11        11        11        10         9        11        11        11        10         9        11        11

MASSDICF    0.75714  -0.20887  -0.41083   0.60322  -0.14476   0.17837   1.00000   0.03120   0.70521   0.87261   0.79726   0.96261  -0.14669   0.64556   0.85402   0.77393
             0.0044    0.5625    0.2720    0.0494    0.6535    0.5998    0.0000    0.9318    0.0338    0.0005    0.0033    0.0001    0.6859    0.0604    0.0008    0.0052
                 12        10         9        11        12        11        12        10         9        11        11        12        10         9        11        11

ASDICF      0.10565   0.20615   0.49215  -0.20892  -0.39756  -0.23343   0.03120   1.00000   0.13279  -0.16684  -0.36594   0.06469   0.64363   0.21954  -0.18421  -0.39989
             0.7715    0.5677    0.2154    0.5624    0.2553    0.5163    0.9318    0.0000    0.7539    0.6450    0.2984    0.8591    0.0446    0.6014    0.6104    0.2522
                 10        10         8        10        10        10        10        10         8        10        10        10        10         8        10        10

CRDICF      0.08208  -0.38875  -0.17902  -0.04014   0.30061   0.03831   0.70521   0.13279   1.00000   0.34662   0.30177   0.51336  -0.24487   0.98526   0.27525   0.27801
             0.8337    0.3412    0.6449    0.9183    0.4319    0.9221    0.0338    0.7539    0.0000    0.3608    0.4300    0.1575    0.5589    0.0001    0.4735    0.4689
                  9         8         9         9         9         9         9         8         9         9         9         9         8         9         9         9

PBDICF      0.85327  -0.08905  -0.56849   0.73405  -0.05950   0.10606   0.87261  -0.16684   0.34662   1.00000   0.81461   0.93093  -0.15111   0.25368   0.98831   0.76867
             0.0008    0.8067    0.1102    0.0101    0.8620    0.7563    0.0005    0.6450    0.3608    0.0000    0.0023    0.0001    0.6769    0.5101    0.0001    0.0057
                 11        10         9        11        11        11        11        10         9        11        11        11        10         9        11        11

SO4DICF     0.65345   0.03986  -0.52958   0.57414  -0.20852   0.14706   0.79726  -0.36594   0.30177   0.81461   1.00000   0.79658  -0.14045   0.21461   0.79974   0.94802
             0.0292    0.9129    0.1426    0.0647    0.5384    0.6661    0.0033    0.2984    0.4300    0.0023    0.0000    0.0033    0.6988    0.5792    0.0031    0.0001
                 11        10         9        11        11        11        11        10         9        11        11        11        10         9        11        11

MASSDICT    0.90579  -0.10083  -0.35287   0.75872  -0.26014   0.20575   0.96261   0.06469   0.51336   0.93093   0.79658   1.00000  -0.04823   0.46071   0.93697   0.78433
             0.0001    0.7817    0.3516    0.0068    0.4142    0.5439    0.0001    0.8591    0.1575    0.0001    0.0033    0.0000    0.8947    0.2120    0.0001    0.0043
                 12        10         9        11        12        11        12        10         9        11        11        12        10         9        11        11

ASDICT      0.11219   0.88131   0.62395  -0.26316  -0.78090  -0.26719  -0.14669   0.64363  -0.24487  -0.15111  -0.14045  -0.04823   1.00000  -0.13997  -0.18341  -0.20692
             0.7576    0.0008    0.0983    0.4626    0.0077    0.4555    0.6859    0.0446    0.5589    0.6769    0.6988    0.8947    0.0000    0.7410    0.6120    0.5662
                 10        10         8        10        10        10        10        10         8        10        10        10        10         8        10        10

CRDICT      0.05326  -0.30998  -0.00808  -0.06555   0.28902   0.11544   0.64556   0.21954   0.98526   0.25368   0.21461   0.46071  -0.13997   1.00000   0.19279   0.22523
             0.8918    0.4549    0.9835    0.8669    0.4507    0.7674    0.0604    0.6014    0.0001    0.5101    0.5792    0.2120    0.7410    0.0000    0.6192    0.5601
                  9         8         9         9         9         9         9         8         9         9         9         9         8         9         9         9

PBDICT      0.89549  -0.11844  -0.50098   0.82900  -0.02722   0.20318   0.85402  -0.18421   0.27525   0.98831   0.79974   0.93697  -0.18341   0.19279   1.00000   0.78760
             0.0002    0.7445    0.1695    0.0016    0.9367    0.5490    0.0008    0.6104    0.4735    0.0001    0.0031    0.0001    0.6120    0.6192    0.0000    0.0040
                 11        10         9        11        11        11        11        10         9        11        11        11        10         9        11        11

SO4DICT     0.65911  -0.02363  -0.32784   0.68854  -0.09404   0.45390   0.77393  -0.39989   0.27801   0.76867   0.94802   0.78433  -0.20692   0.22523   0.78760   1.00000
             0.0274    0.9483    0.3891    0.0191    0.7833    0.1608    0.0052    0.2522    0.4689    0.0057    0.0001    0.0043    0.5662    0.5601    0.0040    0.0000
                 11        10         9        11        11        11        11        10         9        11        11        11     Y  10         9        11        11
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                          CORRELATION ANALYSIS OF CIC DATA C VS F VS T BY CITY SEASON
                                         CITY=VA   SEASON=WINT

                    CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

            MASSDICC    ASDICC    CRDICC    PBDICC      DATE   SO4DICC  MASSDICF    ASDICF    CRDICF    PBDICF   SO4DICF  MASSDICT    ASDICT    CRDICT    PBDICT   SO4DICT

MASSDICC     1.00000   0.00000   0.13179   0.65050   0.05684  -0.81160  -0.04930   0.00000  -0.88218   0.78047   0.41710   0.77663   0.00000  -0.55003   0.76376  -0.29330
              0.0000              0.8682    0.3495    0.9277    0.1884    0.9373              0.1178    0.2195    0.5829    0.1224              0.4500    0.2362    0.7067
                   5         1         4         4         5         4         5         1         4         4         4         5         1         4         4         4

ASDICC       0.00000   1.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000

                   1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1

CRDICC       0.13179   0.00000   1.00000  -0.28802  -0.68382   0.45563  -0.65490   0.00000  -0.03208  -0.38774   0.66673  -0.35260   0.00000   0.64881  -0.37296   0.79858
              0.8682              0.0000    0.7120    0.3162    0.5444    0.3451              0.9679    0.6123    0.3333    0.6474              0.3112    0.6270    0.2014
                   4         1         4         4         4         4         4         1         4         4         4         4         1         4         4         4

PBDICC       0.65050   0.00000  -0.28802   1.00000   0.48866  -0.65061  -0.01902   0.00000  -0.91126   0.94615  -0.40126   0.37147   0.00000  -0.86367   0.96314  -0.80455
              0.3495              0.7120    0.0000    0.5113    0.3494    0.9810              0.0887    0.0538    0.5987    0.6285              0.1363    0.0369    0.1954
                   4         1         4         4         4         4         4         1         4         4         4         4         1         4         4         4

DATE         0.05684   0.00000  -0.68382   0.48866   1.00000  -0.00878  -0.18953   0.00000  -0.08930   0.33133  -0.99492  -0.07787   0.00000  -0.54531   0.36160  -0.76070
              0.9277              0.3162    0.5113    0.0000    0.9912    0.7601              0.9107    0.6687    0.0051    0.9010              0.4547    0.6384    0.2393
                   5         1         4         4         5         4         5         1         4         4         4         5         1         4         4         4

SO4DICC     -0.81160   0.00000   0.45563  -0.65061  -0.00878   1.00000  -0.69180   0.00000   0.70002  -0.86141  -0.08067  -0.94338   0.00000   0.83684  -0.83041   0.65535
              0.1884              0.5444    0.3494    0.9912    0.0000    0.3082              0.3000    0.1386    0.9193    0.0566              0.1632    0.1691    0.3447
                   4         1         4         4         4         4         4         1         4         4         4         4         1         4         4         4

MASSDICF    -0.04930   0.00000  -0.65490  -0.01902  -0.18953  -0.69180   1.00000   0.00000   0.03119   0.28254   0.12657   0.59088   0.00000  -0.45042   0.23134  -0.35812
              0.9373              0.3451    0.9810    0.7601    0.3082    0.0000              0.9688    0.7175    0.8734    0.2941              0.5496    0.7687    0.6419
                   5         1         4         4         5         4         5         1         4         4         4         5         1         4         4         4

ASDICF       0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   1.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000

                   1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1

CRDICF      -0.88218   0.00000  -0.03208  -0.91126  -0.08930   0.70002   0.03119   0.00000   1.00000  -0.90748  -0.00651  -0.50399   0.00000   0.70241  -0.91539   0.53793
              0.1178              0.9679    0.0887    0.9107    0.3000    0.9688              0.0000    0.0925    0.9935    0.4960              0.2976    0.0846    0.4621
                   4         1         4         4         4         4         4         1         4         4         4         4         1         4         4         4

PBDICF       0.78047   0.00000  -0.38774   0.94615   0.33133  -0.86141   0.28254   0.00000  -0.90748   1.00000  -0.23478   0.65049   0.00000  -0.93471   0.99836  -0.81802
              0.2195              0.6123    0.0538    0.6687    0.1386    0.7175              0.0925    0.0000    0.7652    0.3495              0.0653    0.0016    0.1820
                   4         1         4         4         4         4         4         1         4         4         4         4         1         4         4         4

SO4DICF      0.41710   0.00000   0.66673  -0.40126  -0.99492  -0.08067   0.12657   0.00000  -0.00651  -0.23478   1.00000   0.33914   0.00000   0.46345  -0.26589   0.69776
              0.5829              0.3333    0.5987    0.0051    0.9193    0.8734              0.9935    0.7652    0.0000    0.6609              0.5365    0.7341    0.3022
                   4         1         4         4         4         4         4         1         4         4         4         4         1         4         4         4

MASSDICT     0.77663   0.00000  -0.35260   0.37147  -0.07787  -0.94338   0.59088   0.00000  -0.50399   0.65049   0.33914   1.00000   0.00000  -0.62352   0.60629  -0.40782
              0.1224              0.6474    0.6285    0.9010    0.0566    0.2941              0.4960    0.3495    0.6609    0.0000              0.3765    0.3937    0.5922
                   5         1         4         4         5         4         5         1         4         4         4         5         1         4         4         4

ASDICT       0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   0.00000   1.00000   0.00000   0.00000   0.00000

                   1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1

CRDICT      -0.55003   0.00000   0.64881  -0.86367  -0.54531   0.83684  -0.45042   0.00000   0.70241  -0.93471   0.46345  -0.62352   0.00000   1.00000  -0.92943   0.95693
              0.4500              0.3112    0.1363    0.4547    0.1632    0.5496              0.2976    0.0653    0.5365    0.3765              0.0000    0.0706    0.0431
                   4         1         4         4         4         4         4         1         4         4         4         4         1         4         4         4

PBDICT       0.76376   0.00000  -0.37296   0.96314   0.36160  -0.83041   0.23134   0.00000  -0.91539   0.99836  -0.26589   0.60629   0.00000  -0.92943   1.00000  -0.82196
              0.2362              0.6270    0.0369    0.6384    0.1691    0.7687              0.0846    0.0016    0.7341    0.3937              0.0706    0.0000    0.1780
                   4         1         4         4         4         4         4         1         4         4         4         4         1         4         4         4

SO4DICT     -0.29330   0.00000   0.79858  -0.80455  -0.76070   0.65535  -0.35812   0.00000   0.53793  -0.81802   0.69776  -0.40782   0.00000   0.95693  -0.82196   1.00000
              0.7067              0.2014    0.1954    0.2393    0.3447    0.6419              0.4621    0.1820    0.3022    0.5922              0.0431    0.1780    0.0000
                   4         1         4         4         4         4         4         1         4         4         4         4         1         4         4         4
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V①

Y①

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                      CORRELATION ANALYSIS OF DIC TOTAL AND TSP DATA BY CITY
                                              CITY=HA

           CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

         MASSTSP    SO4TSP     PBTSP     CRTSP     ASTSP      DATE MASSDICT    ASDICT    CRDICT    PBDICT   SO4DICT

SSTSP    1.00000   0.65322   0.59436                        0.20493   0.27416   0.00000   0.79717  -0.00424   0.73984
          0.0000    0.0213    0.0460                         0.5229    0.4434              0.2028    0.9936    0.0927
              12        12        12         0         0        12        10         2         4         6         6

4TSP     0.65322   1.00000   0.64473                        0.48707   0.41494   0.00000   0.70013   0.11586   0.83920
          0.0213    0.0000    0.0236                         0.1083    0.2331              0.2999    0.8270    0.0367
              12        12        12         0         0        12        10         2         4         6         6

TSP      0.58436   0.64473   1.00000                        0.57827   0.32737   0.00000  -0.01661   0.17349   0.52451
          0.0460    0.0236    0.0000                         0.0489    0.3558              0.9834    0.7424    0.2854
              12        12        12         0         0        12        10         2         4         6         6

TSP

               0         0         0         0         0         0         0         0         0         0         0

TSP

               0         0         0         0         0         0         0         0         0         0         0

E        0.20493   0.48707   0.57827                        1.00000   0.65825  -0.32094   0.19746   0.45794   0.64032
          0.5229    0.1083    0.0489                         0.0000    0.0016    0.5351    0.5606    0.0861    0.0184
              12        12        12         0         0        23        20         6        11        15        13

SDICT    0.27416   0.41494   0.32737                        0.65825   1.00000   0.88805   0.08563   0.63249   0.66463
          0.4434    0.2331    0.3558                         0.0016    0.0000    0.0181    0.8023    0.0114    0.0132
              10        10        10         0         0        20        20         6        11        15        13

ICT      0.00000   0.00000   0.00000                       -0.32094   0.88805   1.00000  -0.01544   0.72180   0.18844
                                                             0.5351    0.0181    0.0000    0.9902    0.1053    0.7207
               2         2         2         0         0         6         6         6         3         6         6

ICT      0.79717   0.70013  -0.01661                        0.19746   0.08563  -0.01544   1.00000   0.00490   0.32493
          0.2028    0.2999    0.9834                         0.5606    0.8023    0.9902    0.0000    0.9886    0.4323
               4         4         4         0         0        11        11         3        11        11         8

ICT     -0.00424   0.11586   0.17349                        0.45794   0.63249   0.72180   0.00490   1.00000   0.38015
          0.9936    0.8270    0.7424                         0.0861    0.0114    0.1053    0.9886    0.0000    0.2229
               6         6         6         0         0        15        15         6        11        15        12

DICT     0.73984   0.83920   0.52451                        0.64032   0.66463   0.18844   0.32493   0.38015   1.00000
          0.0927    0.0367    0.2854                         0.0184    0.0132    0.7207    0.4323    0.2229    0.0000
               6         6         6         0         0        13        13         6         8
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                    CORRELATION ANALYSIS OF DIC TOTAL AND TSP DATA BY CITY SEASON
                                       CITY=HA    SEASON=FALL

       CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

          MASSTSP    SO4TSP     PBTSP     CRTSP     ASTSP      DATE MASSDICT    ASDICT    CRDICT    PBDICT   SO4DICT

STSP      1.00000   0.12114   0.65141                       -0.08982  0.77596   0.00000   0.00000   1.00000   1.00000
           0.0000    0.3461    0.2337                         0.8858   0.2240
                5         5         5         0         0         5        4         2         1         2         2

TSP       0.12114   1.00000  -0.35527                        0.46754  0.75563   0.00000   0.00000   1.00000   1.00000
           0.8461    0.0000    0.5574                         0.4272   0.2444
                5         5         5         0         0         5        4         2         1         2         2

SP        0.63141  -0.35527   1.00000                       -0.76265  0.30387   0.00000   0.00000   1.00000   1.00000
           0.2337    0.5574    0.0000                         0.1338   0.6961
                5         5         5         0         0         5        4         2         1         2         2
SP


                0         0         0         0         0         0        0         0         0         0         0
SP


                0         0         0         0         0         0        0         0         0         0         0

E        -0.08982   0.46754  -0.76265                        1.00000 -0.24295  -0.32094  -0.04933   0.14990   0.35081
           0.8858    0.4272    0.1338                         0.0000   0.4467    0.5351    0.9261    0.7003    0.3942
                5         5         5         0         0        13       12         6         6         9         8

DICT      0.77596   0.75563   0.30387                       -0.24295  1.00000   0.88805  -0.14231   0.61794   0.49572
           0.2240    0.2444    0.6961                         0.4467   0.0000    0.0181    0.7880    0.0761    0.2116
                4         4         4         0         0        12       12         6         6         9         9

CT        0.00000   0.00000   0.00000                       -0.32094  0.88805   1.00000  -0.01544   0.72180   0.18844
                                                              0.5351   0.0181    0.0000    0.9902    0.1053    0.7207
                2         2         2         0         0         6        6         6         3         6         6

CT        0.00000   0.00000   0.00000                       -0.04933 -0.14231  -0.01544   1.00000   0.58108  -0.28426
                                                              0.9261   0.7880    0.9902    0.0000    0.2265    0.6430
                1         1         1         0         0         6        6         3         6         6         5

CT        1.00000   1.00000   1.00000                        0.14990  0.61794   0.72180   0.58108   1.00000   0.12291
                                                              0.7003   0.0761    0.1053    0.2265    0.0000    0.7718
                2         2         2         0         0         9        9         6         6         9         8

ICT       1.00000   1.00000   1.00000                        0.35081  0.49572   0.18844  -0.28426   0.12291   1.00000
                                                              0.3942   0.2116    0.7207
                2         2         2         0         0
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                    CORRELATION ANALYSIS OF DIC TOTAL AND TSP DATA BY CITY SEASON
                                     CITY=FA    SEASON=WINT

          CORRELATION COEFFICIENTS / PROB > |R| UNDER H0:RHO=0 / NUMBER OF OBSERVATIONS

           MASSTSP    SO4TSP     PBTSP     CRTSP     ASTSP      DATE  MASSDICT    ASDICT    CRDICT    PBDICT   SO4DICT

SSTSP      1.00000   0.89586   0.68434                       0.48311   0.22189             0.87594  -0.49567   0.85250
            0.0000    0.0064    0.0899                        0.2721    0.6725              0.3205    0.5043    0.1475
                 7         7         7         0         0         7         6         0         3         4         4

4TSP       0.89586   1.00000   0.65726                       0.25099   0.17553             0.86982  -0.31050   0.94771
            0.0064    0.0000    0.1087                        0.5872    0.7394              0.3285    0.6895    0.0523
                 7         7         7         0         0         7         6         0         3         4         4

TSP        0.68434   0.65726   1.00000                       0.40755   0.00864             0.05917  -0.28959  -0.05029
            0.0899    0.1087    0.0000                        0.2901    0.9870              0.9623    0.7104    0.9497
                 7         7         7         0         0         7         6         0         3         4         4

TSP

                 0         0         0         0         0         0         0         0         0         0         0

TSP

                 0         0         0         0         0         0         0         0         0         0         0

TE         0.48311   0.25099   0.46755                       1.00000   0.85143            -0.68529   0.44828   0.02472
            0.2721    0.5872    0.2901                        0.0000    0.0073              0.2016    0.3726    0.9685
                 7         7         7         0         0        10         8         0         5         6         5

SSDICT     0.22189   0.17553   0.00864                       0.85143   1.00000            -0.53226   0.53759   0.33092
            0.6726    0.7394    0.9870                        0.0073    0.0000              0.3558    0.2713    0.5865
                 6         6         6         0         0         8         8         0         5         6         5

ICT

                 0         0         0         0         0         0         0         0         0         0         0

ICT        0.87594   0.86982   0.05917                      -0.68529  -0.53226             1.00000  -0.72760   0.94530
            0.3205    0.3285    0.9623                        0.2016    0.3558              0.0000    0.1635    0.2115
                 3         3         3         0         0         5         5         0         5         5         3

ICT       -0.49567  -0.31050  -0.28959                       0.44828   0.53759            -0.72760   1.00000   0.11876
            0.5043    0.6895    0.7104                        0.3726    0.2713              0.1635    0.0000    0.8812
                 4         4         4         0         0         6         6         0         5         6         4

 DICT      0.85250   0.94771  -0.05029                       0.02472   0.33092             0.94530   0.11876   1.00000
            0.1475    0.0523    0.9497                        0.9685    0.5865              0.2115    0.8812    0.0000
                 4         4         4         0         0         5         5         0         3         4         5
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                        CORRELATION ANALYSIS OF DIC TOTAL AND TSP DATA BY CITY
                                              CITY=MD

          CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

         MASSTSP    SO4TSP     P3TSP      CRTSP      ASTSP       DATE  MASSDICT    ASDICT    CRDICT    PBDICT   SO4DICT

SSTSP    1.00000   0.23237   0.45043                           0.09926   0.66457   0.06732   0.28072   0.48293  -0.12838
          0.0000    0.2980    0.0354                            0.6603    0.0007    0.8742    0.2923    0.0496    0.6234
              22        22        22          0          0          22        22         8        16        17        17

4TSP     0.23237   1.00000   0.52644                           0.55137   0.56172   0.14575  -0.30983   0.44434   0.59880
          0.2980    0.0000    0.0118                            0.0078    0.0065    0.7306    0.2429    0.0739    0.0111
              22        22        22          0          0          22        22         8        16        17        17

TSP      0.45043   0.52644   1.00000                          -0.03581   0.45754  -0.09525   0.60625   0.80465   0.09934
          0.0354    0.0118    0.0000                            0.8743    0.0323    0.8225    0.0128    0.0001    0.7044
              22        22        22          0          0          22        22         8        16        17        17

TSP

               0         0         0          0          0           0         0         0         0         0         0

TSP

               0         0         0          0          0           0         0         0         0         0         0

TE       0.09926   0.55137  -0.03581                           1.00000   0.45187  -0.45313  -0.39658   0.05010   0.58382
          0.6603    0.0078    0.8743                            0.0000    0.0304    0.2206    0.1150    0.8435    0.0110
              22        22        22          0          0          23        23         9        17        18        18

SSDICT   0.66457   0.56172   0.45754                           0.45187   1.00000   0.07847  -0.05304   0.62378   0.18720
          0.0007    0.0065    0.0323                            0.0304    0.0000    0.8410    0.8398    0.0057    0.4570
              22        22        22          0          0          23        23         9        17        18        18

ICT      0.06732   0.14575  -0.09525                          -0.45313   0.07847   1.00000  -0.42664  -0.13942  -0.21263
          0.8742    0.7306    0.8225                            0.2206    0.8410    0.0000    0.2918    0.7205    0.6132
               8         8         8          0          0           9         9         9         8         9         8

ICT      0.28072  -0.30983   0.60625                          -0.39658  -0.05304  -0.42664   1.00000   0.44852  -0.26052
          0.2923    0.2429    0.0128                            0.1150    0.8398    0.2918    0.0000    0.0710    0.3298
              16        16        16          0          0          17        17         8        17        17        16

ICT      0.48293   0.44434   0.80465                           0.05010   0.62378  -0.13942   0.44852   1.00000   0.13343
          0.0496    0.0739    0.0001                            0.8435    0.0057    0.7205    0.0710    0.0000    0.6097
              17        17        17          0          0          18        18         9        17        18        17

DICT    -0.12838   0.59880   0.09934                           0.58382   0.18720  -0.21263  -0.26052   0.13343   1.00000
          0.6234    0.0111    0.7044                            0.0110    0.4570    0.6132    0.3298    0.6097    0.0000
              17        17        17          0          0          18        18         8        16        17        18
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                        CORRELATION ANALYSIS OF DIC TOTAL AND TSP DATA BY CITY SEASON
                                         CITY=MO    SEASON=FALL

             CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

           MASSTSP    SO4TSP     PBTSP     CRTSP     ASTSP      DATE  MASSDICT    ASDICT    CRDICT    PBDICT   SO4DICT

MASSTSP    1.00000   0.57611   0.90468                         0.13697   0.84293  -0.03668   0.60071   0.90247   0.11809
            0.0000    0.0393    0.0001                          0.6554    0.0003    0.9378    0.0663    0.0001    0.7453
                13        13        13         0         0          13        13         7        10        11        10

SO4TSP     0.57611   1.00000   0.54533                         0.19239   0.68907   0.44282   0.01075   0.51059   0.60976
            0.0393    0.0000    0.0539                          0.5289    0.0092    0.3197    0.9765    0.1085    0.0612
                13        13        13         0         0          13        13         7        10        11        10

PBTSP      0.90468   0.54533   1.00000                         0.00212   0.85311  -0.21429   0.69063   0.90927   0.20304
            0.0001    0.0539    0.0000                          0.9945    0.0002    0.6445    0.0270    0.0001    0.5737
                13        13        13         0         0          13        13         7        10        11        10

RTSP

                 0         0         0         0         0           0         0         0         0         0         0

STSP

                 0         0         0         0         0           0         0         0         0         0         0

ATE        0.13697   0.19239   0.00212                         1.00000  -0.19848  -0.57698   0.09634  -0.16246   0.34141
            0.6554    0.5289    0.9945                          0.0000    0.5157    0.1750    0.7912    0.6332    0.3343
                13        13        13         0         0          13        13         7        10        11        10

ASSDICT    0.84293   0.68907   0.85311                        -0.19848   1.00000   0.13209   0.39384   0.82282   0.16373
            0.0003    0.0092    0.0002                          0.5157    0.0000    0.7777    0.2601    0.0019    0.6513
                13        13        13         0         0          13        13         7        10        11        10

SDICT     -0.03668   0.44282  -0.21429                        -0.57698   0.13209   1.00000  -0.73763  -0.21011   0.06909
            0.9378    0.3197    0.6445                          0.1750    0.7777    0.0000    0.0942    0.6511    0.8965
                 7         7         7         0         0           7         7         7         6         7         6

RDICT      0.60071   0.01075   0.69063                         0.09634   0.39384  -0.73763   1.00000   0.64653   0.01405
            0.0663    0.9765    0.0270                          0.7912    0.2601    0.0942    0.0000    0.0434    0.9714
                10        10        10         0         0          10        10         6        10        10         9

DICT       0.90247   0.51059   0.90927                        -0.16246   0.82282  -0.21011   0.64653   1.00000   0.12150
            0.0001    0.1085    0.0001                          0.6332    0.0019    0.6511    0.0434    0.0000    0.7381
                11        11        11         0         0          11        11         7        10        11        10

4DICT      0.11809   0.60976   0.20304                         0.34141   0.16373   0.06909   0.01405   0.12150   1.00000
            0.7453    0.0612    0.5737                          0.3343    0.6513    0.8965    0.9714    0.7381    0.0000
                10        10        10         0         0          10        10         6         9        10        10
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                CORRELATION ANALYSIS OF DIC TOTAL AND TSP DATA BY CITY SEASON
                                    CITY=MO   SEASON=WINT

       CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

        MASSTSP    SU4TSP     PBTSP     CRTSP     ASTSP      DATE MASSDICT    ASDICT    CRDICT    PBDICT   SO4DICT

SSTSP   1.00000   0.25368   0.06877                       0.70450   0.82224   0.00000  -0.45824  -0.13212  -0.28579
         0.0000    0.5101    0.8605                        0.0341    0.0065              0.3608    0.8030    0.5344
              9         9         9         0         0         9         9         1         6         6         7

4TSP    0.25368   1.00000   0.67976                       0.29946   0.29875   0.00000  -0.58224   0.45548   0.24956
         0.5101    0.0000    0.0440                        0.4337    0.4349              0.2253    0.3640    0.5894
              9         9         9         0         0         9         9         1         6         6         7

TSP     0.06877   0.67976   1.00000                      -0.24688   0.25050   0.00000   0.19641   0.71963   0.26399
         0.8605    0.0440    0.0000                        0.5219    0.5156              0.7092    0.1069    0.5673
              9         9         9         0         0         9         9         1         6         6         7

TSP

              0         0         0         0         0         0         0         0         0         0         0

SP

              0         0         0         0         0         0         0         0         0         0         0

E       0.70450   0.29946  -0.24688                       1.00000   0.61087  -1.00000  -0.80293   0.29965  -0.24783
         0.0341    0.4337    0.5219                        0.0000    C.0606              0.0297    0.5138    0.5540
              9         9         9         0         0        10        10         2         7         7         8

SDICT   0.82224   0.29875   0.25050                       0.61087   1.00000  -1.00000  -0.26255   0.57243  -0.32669
         0.0065    0.4349    0.5156                        0.0606    C.0000              0.5695    0.1793    0.4296
              9         9         9         0         0        10        10         2         7         7         8

ICT     0.00000   0.00000   0.00000                      -1.00000  -1.00000   1.00000  -1.00000  -1.00000  -1.00000

              1         1         1         0         0         2         2         2         2         2         2

ICT    -0.45824  -0.58224   0.19641                      -0.80293  -0.26255  -1.00000   1.00000  -0.05674   0.22316
         0.3608    0.2253    0.7092                        0.0297    0.5695              0.0000    0.9038    0.6305
              6         6         6         0         0         7         7         2         7         7         7

ICT    -0.13212   0.45548   0.71963                       0.29965   0.57243  -1.00000  -0.05674   1.00000   0.05850
         0.8030    0.3640    0.1069                        0.5138    0.1793              0.9038    0.0000    0.9009
              6         6         6         0         0         7         7         2         7         7         7

DICT   -0.28579   0.24956   0.26399                      -0.24783  -0.32669  -1.00000   0.22316   0.05850   1.00000
         0.5344    0.5894    0.5673                        0.5540    C.4236              0.6305    0.9009    0.0000
              7         7         7         0         0         8         8
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                      CORRELATION ANALYSIS OF DIC TOTAL AND TSP DATA BY CITY
                                              CITY=DC

          CORRELATION COEFFICIENTS / PROB > |R| UNDER H0:RHO=0 / NUMBER OF OBSERVATIONS

         MASSTSP    SO4TSP     PBTSP     CRTSP     ASTSP      DATE MASSDICT    ASDICT    CRDICT    PBDICT   SO4DICT

STSP     1.00000               0.84248                     0.19514  0.81101  0.80053   0.18672   0.82364   0.37903
          0.0000                0.0001                      0.4529   0.0001   0.0557    0.5052    0.0002    0.2015
              17         0          17         0         0      17       16        6        15        15        13
TSP

               0         0           0         0         0       0        0        0         0         0         0
SP       0.84248               1.00000                     0.26845  0.73689  0.78615   0.20114   0.99321   0.44396
          0.0001                0.0000                      0.2975   0.0011   0.0637    0.4723    0.0001    0.1286
              17         0          17         0         0      17       16        6        15        15        13
SP

               0         0           0         0         0       0        0        0         0         0         0
SP

               0         0           0         0         0       0        0        0         0         0         0
E        0.19514               0.26845                     1.00000  0.43305  0.98567   0.67465   0.26713   0.56650
          0.4529                0.2975                      0.0000   0.0726   0.0001    0.0030    0.3000    0.0277
              17         0          17         0         0      19       18        7        17        17        15
SDICT    0.81101               0.73689                     0.43305  1.00000  0.80041   0.26932   0.83814   0.62905
          0.0001                0.0011                      0.0726   0.0000   0.0306    0.2959    0.0001    0.0120
              16         0          16         0         0      18       18        7        17        17        15
ICT      0.80053               0.78615                     0.98567  0.80041  1.00000   0.96206   0.67372   0.70040
          0.0557                0.0637                      0.0001   0.0306   0.0000    0.0005    0.0970    0.1878
               6         0           6         0         0       7        7        7         7         7         5
ICT      0.18672               0.20114                     0.67465  0.26932  0.96206   1.00000   0.06316   0.35098
          0.5052                0.4723                      0.0030   0.2959   0.0005    0.0000    0.8097    0.1996
              15         0          15         0         0      17       17        7        17        17        15
ICT      0.82364               0.99321                     0.26713  0.83814  0.67372   0.06316   1.00000   0.40985
          0.0002                0.0001                      0.3000   0.0001   0.0970    0.8097    0.0000    0.1292
              15         0          15         0         0      17       17        7        17        17        15
DICT     0.37903               0.44396                     0.56650  0.62905  0.70040   0.35098   0.40985   1.00000
          0.2015                0.1286                      0.0277   0.0120   0.1878    0.1996    0.1292
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                          CORRELATION ANALYSIS OF DIC TOTAL AND TSP DATA BY CITY
                                                 CITY=DT

            CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

        MASSTSP   SO4TSP     PBTSP     CRTSP     ASTSP      DATE MASSDICT   ASDICT    CRDICT    PBDICT   SO4DICT

SSTSP   1.00000  0.58236   0.78001                         0.25193  0.88583 -0.24464  -0.06682  0.40344   0.12157
         0.0000   0.0036    0.0001                          0.2462   0.0001   0.4957    0.7795   0.0777    0.6097
             23       23        23         0         0         23       23       10        20       20        20

TSP     0.58236  1.00000   0.36452                         0.46707  0.55146  0.28771  -0.16537  0.11819   0.74345
         0.0036   0.0000    0.0872                          0.0246   0.0064   0.4202    0.4859   0.6197    0.0002
             23       23        23         0         0         23       23       10        20       20        20

SP      0.78001  0.36452   1.00000                         0.05917  0.70385 -0.30333  -0.45366  0.97494  -0.03277
         0.0001   0.0872    0.0000                          0.7886   0.0002   0.3942    0.0445   0.0001    0.8909
             23       23        23         0         0         23       23       10        20       20        20

SP

              0        0         0         0         0          0        0        0         0        0         0

SP

              0        0         0         0         0          0        0        0         0        0         0

E       0.25193  0.46707   0.05917                         1.00000  0.37703  0.03106  -0.11941  0.07886   0.76447
         0.2462   0.0246    0.7886                          0.0000   0.0334   0.9091    0.5372   0.6843    0.0001
             23       23        23         0         0         32       32       16        29       29        28

SDICT   0.88583  0.55146   0.70385                         0.37703  1.00000  0.18060   0.06057  0.26368   0.51352
         0.0001   0.0064    0.0002                          0.0334   0.0000   0.5033    0.7549   0.1669    0.0052
             23       23        23         0         0         32       32       16        29       29        28

ICT    -0.24464  0.28771  -0.30333                         0.03106  0.18060  1.00000   0.51112 -0.32718   0.18990
         0.4957   0.4202    0.3942                          0.9091   0.5033   0.0000    0.0430   0.2161    0.4978
             10       10        10         0         0         16       16       16        16       16        15

ICT    -0.06682 -0.16537  -0.45366                        -0.11941  0.06057  0.51112   1.00000 -0.16168  -0.16046
         0.7795   0.4859    0.0445                          0.5372   0.7549   0.0430    0.0000   0.4021    0.4147
             20       20        20         0         0         29       29       16        29       29        28

CT      0.40344  0.11819   0.97494                         0.07886  0.26368 -0.32718  -0.16168  1.00000  -0.12814
         0.0777   0.6197    0.0001                          0.6843   0.1669   0.2161    0.4021   0.0000    0.5158
             20       20        20         0         0         29       29       16        29       29        28

ICT     0.12157  0.74345  -0.03277                         0.76447  0.51352  0.18990  -0.16046 -0.12814   1.00000
         0.6097   0.0002    0.8909                          0.0001   0.0052   0.4978    0.4147   0.5158    0.0000
             20       20        20         0         0         28       28       15        28       28        28
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                  CORRELATION ANALYSIS OF DIC TOTAL AND TSP DATA BY CITY SEASON
                                      CITY=DT   SEASON=FALL

        CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

        MASSTSP    SO4TSP     PBTSP     CRTSP     ASTSP       DATE  MASSDICT    ASDICT    CRDICT    PBDICT   SO4DICT

SSTSP   1.00000   0.24628   0.80020                        0.29653   0.94153   0.08977   0.13080   0.56008   0.02813
         0.0000    0.4173    0.0010                         0.3252    0.0001    0.8482    0.6853    0.0582    0.9309
             13        13        13         0         0         13        13         7        12        12        12

4TSP    0.24628   1.00000   0.30464                       -0.20243   0.34664   0.40349  -0.07962   0.17593   0.18709
         0.4173    0.0000    0.3115                         0.5072    0.2459    0.3694    0.8057    0.5844    0.5604
             13        13        13         0         0         13        13         7        12        12        12

TSP     0.80020   0.30464   1.00000                        0.14535   0.63684   0.15682  -0.23244   0.97440  -0.01812
         0.0010    0.3115    0.0000                         0.6356    0.0192    0.7370    0.4672    0.0001    0.9554
             13        13        13         0         0         13        13         7        12        12        12
TSP

              0         0         0         0         0          0         0         0         0         0         0
TSP

              0         0         0         0         0          0         0         0         0         0         0
TE      0.29653  -0.20243   0.14535                        1.00000   0.35202  -0.42256   0.48690   0.14714   0.46847
         0.3252    0.5072    0.6356                         0.0000    0.1081    0.1503    0.0252    0.5245    0.0372
             13        13        13         0         0         22        22        13        21        21        20

SSDICT  0.94153   0.34664   0.63684                        0.35202   1.00000   0.24794   0.31639   0.38377   0.23238
         0.0001    0.2459    0.0192                         0.1081    0.0000    0.4141    0.1623    0.0859    0.3242
             13        13        13         0         0         22        22        13        21        21        20

ICT     0.08977   0.40349   0.15682                       -0.42256   0.24794   1.00000   0.45386  -0.09493  -0.28954
         0.8482    0.3694    0.7370                         0.1503    0.4141    0.0000    0.1193    0.7577    0.3613
              7         7         7         0         0         13        13        13        13        13        12

ICT     0.13080  -0.07962  -0.23244                        0.48690   0.31639   0.45386   1.00000   0.01463   0.02565
         0.6853    0.8057    0.4672                         0.0252    0.1623    0.1193    0.0000    0.9498    0.9145
             12        12        12         0         0         21        21        13        21        21        20

ICT     0.56008   0.17593   0.97440                        0.14714   0.38377  -0.09493   0.01463   1.00000  -0.09991
         0.0582    0.5844    0.0001                         0.5245    0.0859    0.7577    0.9498    0.0000    0.6751
             12        12        12         0         0         21        21        13        21        21        20

DICT    0.02813   0.18709  -0.01812                        0.46847   0.23238  -0.28954   0.02565  -0.09991   1.00000
         0.9309    0.5604    0.9554                         0.0372    0.3242    0.3613    0.9145    0.6751    0.0000
             12        12        12         0         0         20        20        12        20        20        20
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                 CORRELATION ANALYSIS OF DIC TOTAL AND TSP DATA BY CITY SEASON
                                      CITY=CT   SEASON=WINT

        CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

          MASSTSP    SO4TSP     PBTSP     CRTSP     ASTSP      DATE MASSDICT    ASDICT    CRDICT    PBDICT   SO4DICT

ASSTSP    1.00000   0.69830   0.81898                       0.09418   0.85847  -0.99309  -0.15327   0.07211  -0.03343
           0.0000    0.0247    0.0038                        0.7958    0.0015    0.0749    0.7171    0.8653    0.9374
               10        10        10         0         0        10        10         3         8         8         8

O4TSP     0.69830   1.00000   0.48362                       0.10053   0.56495   0.81169   0.35802  -0.33361   0.92646
           0.0247    0.0000    0.1567                        0.7823    0.0888    0.3971    0.3839    0.4193    0.0009
               10        10        10         0         0        10        10         3         8         8         8

BTSP      0.81898   0.48362   1.00000                      -0.31456   0.81793  -0.97798  -0.94668   0.98747  -0.59731
           0.0038    0.1567    0.0000                        0.3760    0.0038    0.1338    0.0004    0.0001    0.1179
               10        10        10         0         0        10        10         3         8         8         8

RTSP

                0         0         0         0         0         0         0         0         0         0         0

STSP

                0         0         0         0         0         0         0         0         0         0         0

TE        0.09418   0.10053  -0.31456                       1.00000   0.18395   0.17443   0.29330  -0.35204   0.52841
           0.7958    0.7823    0.3760                        0.0000    0.6109    0.8884    0.4808    0.3924    0.1782
               10        10        10         0         0        10        10         3         8         8         8

SSDICT    0.85847   0.56495   0.81793                       0.18395   1.00000  -0.88737   0.14739  -0.19163   0.57708
           0.0015    0.0888    0.0038                        0.6109    0.0000    0.3051    0.7276    0.6494    0.1342
               10        10        10         0         0        10        10         3         8         8         8

DICT     -0.99309   0.81169  -0.97798                       0.17443  -0.88737   1.00000   0.98320  -0.97668   0.99589
           0.0749    0.3971    0.1338                        0.8884    0.3051    0.0000    0.1169    0.1378    0.0094
                3         3         3         0         0         3         3         3         3         3         3

DICT     -0.15327   0.35802  -0.94668                       0.29330   0.14739   0.98320   1.00000  -0.96501   0.56219
           0.7171    0.3839    0.0004                        0.4808    0.7276    0.1169    0.0000    0.0001    0.1469
                8         8         8         0         0         8         8         3         8         8         8

DICT      0.07211  -0.33361   0.98747                      -0.35204  -0.19163  -0.97668  -0.96501   1.00000  -0.58041
           0.8653    0.4193    0.0001                        0.3924    0.6494    0.1378    0.0001    0.0000    0.1314
                8         8         8         0         0         8         8         3         8         8         8

DICT     -0.03343   0.92646  -0.59731                       0.52841   0.57708   0.99989   0.56219  -0.58041   1.00000
           0.9374    0.0009    0.1179                        0.1782    0.1342    0.0094    0.1469    0.1314    0.0000
                8         8         8         0         0         8
```

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                    CORRELATION ANALYSIS OF DIC TOTAL AND TSP DATA BY CITY
                                           CITY=TC

          CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

          MASSTSP    SO4TSP      PBTSP      CRTSP      ASTSP        DATE MASSDICT     ASDICT     CRDICT     PBDICT    SO4DICT

ASSTSP    1.00000               0.81402                          0.48853    0.83329    0.19675    0.57652    0.68063    0.69514
           0.0000                0.0001                           0.0338     C.0001     0.5399     0.0245     0.0019     0.0040
               19         0          19          C          0         19         18         12         15         18         15
04TSP

                0         0           0          0          0          0          0          0          0          0          0
BTSP      0.81402               1.00000                          0.20911    0.65401    0.37258    0.51830    0.87753    0.48775
           0.0001                0.0000                           0.3903     0.0032     0.2330     0.0478     0.0001     0.0651
               19         0          19          0          0         19         18         12         15         18         15
RTSP

                0         0           0          0          0          0          0          0          0          0          0
STSP

                0         0           0          0          0          0          0          0          0          0          0
TE        0.48853               0.20911                          1.00000    0.42238   -0.28169    0.25463   -0.02312    0.48678
           0.0338                0.3903                           0.0000     C.0808     0.3751     0.3597     0.9275     0.0657
               19         0          19          0          0         19         18         12         15         18         15
 SSDICT   0.83329               0.65401                          0.42238    1.00000    0.14252    0.75778    0.50943    0.85759
           0.0001                0.0032                           0.0808     C.0000     0.6586     0.0011     0.0308     0.0001
               18         0          18          0          0         18         18         12         15         18         15
SDICT     0.19675               0.37258                         -0.28169    0.14252    1.00000    0.38380    0.23740   -0.24420
           0.5399                0.2330                           0.3751     0.6586     0.0000     0.3079     0.4575     0.4966
               12         0          12          0          0         12         12         12          9         12         10
 DICT     0.57652               0.51830                          0.25463    0.75778    0.38380    1.00000    0.39926    0.71929
           0.0245                0.0478                           0.3597     0.0011     0.3079     0.0000     0.1404     0.0084
               15         0          15          0          0         15         15          9         15         15         12
 DICT     0.68063               0.87753                         -0.02312    0.50943    0.23740    0.39926    1.00000    0.32732
           0.0019                0.0001                           0.9275     C.0308     0.4575     0.1404     0.0000     0.2337
               18         0          18          0          0         18         18         12         15         18         15
 4DICT    0.69514               0.48775                          0.48678    0.85759   -0.24420    0.71929    0.32732    1.00000
           0.0040                0.0651                           0.0657     C.0001     0.4966     0.0084     0.2337     0.0000
               15         0          15          0          0         15         15         10
```

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                    CORRELATION ANALYSIS OF DIC TOTAL AND TSP DATA BY CITY
                                          CITY=TO

         CORRELATION COEFFICIENTS / PROB > |R| UNDER H0:RHO=0 / NUMBER OF OBSERVATIONS

         MASSTSP     SO4TSP      PBTSP      CRTSP      ASTSP        DATE  MASSDICT     ASDICT     CRDICT     PBDICT    SO4DICT

SSTSP    1.00000    0.42015    0.61807                          -0.05672   0.33126    0.37610    0.27631    0.50020    0.24952
          0.0000     0.0931     0.0022                            0.8020    0.1537     0.4057     0.3002     0.0409     0.3698
              22         17         22          0          0          22        20          7         16         17         15

4TSP     0.42015    1.00000    0.61471                           0.22424   0.54867    0.53682    0.21778    0.56132    0.84462
          0.0931     0.0000     0.0086                            0.3869    0.0342     0.3509     0.4965     0.0576     0.0021
              17         17         17          0          0          17        15          5         12         12         10

TSP      0.61807    0.61471    1.00000                           0.03406   0.60908    0.69015    0.18543    0.83980    0.78097
          0.0022     0.0086     0.0000                            0.8504    0.0044     0.0861     0.4917     0.0001     0.0006
              22         17         22          0          0          22        20          7         16         17         15

TSP

               0          0          0          0          0           0         0          0          0          0          0

TSP

               0          0          0          0          0           0         0          0          0          0          0

TE      -0.05672    0.22424    0.03406                           1.00000   0.53918   -0.63973   -0.09949   -0.12326    0.18077
          0.9020     0.3869     0.8804                            0.0000    0.0018     0.0137     0.6287     0.5320     0.3979
              22         17         22          0          0          33        31         14         26         28         24

SSDICT   0.33126    0.54867    0.60908                           0.53918   1.00000    0.02187    0.29224    0.44086    0.67457
          0.1537     0.0342     0.0044                            0.0018    0.0000     0.9409     0.1474     0.0189     0.0003
              20         15         20          0          0          31        31         14         26         28         24

ICT      0.37610    0.53682    0.69015                          -0.63973   0.02187    1.00000   -0.12144    0.38554    0.05325
          0.4057     0.3509     0.0861                            0.0137    0.9409     0.0000     0.6927     0.1734     0.8628
               7          5          7          0          0          14        14         14         13         14         13

ICT      0.27631    0.21778    0.18543                          -0.09949   0.29224   -0.12144    1.00000   -0.14378    0.04538
          0.3002     0.4965     0.4917                            0.6287    0.1474     0.6927     0.0000     0.4835     0.8452
              16         12         16          0          0          26        26         13         26         26         21

ICT      0.50020    0.56132    0.83980                          -0.12326   0.44086    0.38554   -0.14378    1.00000    0.66092
          0.0409     0.0576     0.0001                            0.5320    0.0189     0.1734     0.4835     0.0000     0.0006
              17         12         17          0          0          28        28         14         26         28         23

 DICT    0.24952    0.84462    0.78097                           0.18077   0.67457    0.05325    0.04538    0.66092    1.00000
          0.3698     0.0021     0.0006                            0.3979    0.0003     0.8628     0.8452     0.0006     0.0000
              15         10         15          0          0          24        24         13         21         23         24
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                 CORRELATION ANALYSIS OF DIC TOTAL AND TSP DATA BY CITY SEASON
                                   CITY=TO   SEASON=FALL

          CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

          MASSTSP    SO4TSP     PBTSP     CRTSP     ASTSP      DATE MASSDICT    ASDICT    CRDICT    PBDICT   SO4DICT

ASSTSP    1.00000   0.65062   0.67303                      -0.16124  0.36043   0.14957  -0.13659   0.66035   0.53499
           0.0000    0.0220    0.0165                        0.6166   0.2762    0.8103    0.7260    0.0529    0.1719
               12        12        12         0         0        12       11         5         9         9         8

O4TSP     0.65062   1.00000   0.83289                      -0.06910  0.73525   0.53682   0.26636   0.74478   0.90081
           0.0220    0.0000    0.0008                        0.8310   0.0099    0.3509    0.4884    0.0213    0.0023
               12        12        12         0         0        12       11         5         9         9         8

BTSP      0.67303   0.83289   1.00000                      -0.13702  0.82538   0.67562   0.10025   0.85893   0.98162
           0.0165    0.0008    0.0000                        0.6711   0.0018    0.2106    0.7975    0.0030    0.0001
               12        12        12         0         0        12       11         5         9         9         8

RTSP

                0         0         0         0         0         0        0         0         0         0         0

STSP

                0         0         0         0         0         0        0         0         0         0         0

ATE      -0.16124  -0.06910  -0.13702                       1.00000  0.05528  -0.82637   0.37679  -0.32690   0.04134
           0.6166    0.8310    0.6711                        0.0000   0.8119    0.0017    0.1232    0.1719    0.8792
               12        12        12         0         0        22       21        11        18        19        16

ASSDICT   0.36043   0.73525   0.82538                       0.05528  1.00000   0.17993   0.55428   0.57009   0.79020
           0.2762    0.0099    0.0018                        0.8119   0.0000    0.5965    0.0170    0.0108    0.0003
               11        11        11         0         0        21       21        11        18        19        16

SDICT     0.14957   0.53682   0.67562                      -0.82637  0.17993   1.00000  -0.19606   0.37004   0.11276
           0.8103    0.3509    0.2106                        0.0017   0.5965    0.0000    0.5872    0.2626    0.7565
                5         5         5         0         0        11       11        11        10        11        10

DICT     -0.13659   0.26636   0.10025                       0.37679  0.55428  -0.19606   1.00000  -0.11557   0.21524
           0.7260    0.4884    0.7975                        0.1232   0.0170    0.5872    0.0000    0.6479    0.4599
                9         9         9         0         0        18       18        10        18        18        14

DICT      0.66035   0.74478   0.85893                      -0.32690  0.57009   0.37004  -0.11557   1.00000   0.75632
           0.0529    0.0213    0.0030                        0.1719   0.0108    0.2626    0.6479    0.0000    0.0011
                9         9         9         0         0        19       19        11        18        19        15

4DICT     0.53499   0.90081   0.98162                       0.04134  0.79020   0.11276   0.21524   0.75632   1.00000
           0.1719    0.0023    0.0001                        0.8792   0.0003    0.7565    0.4599    0.0011    0.0000
                8         8         8         0         0        16       16        10        14        15
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                    CORRELATION ANALYSIS OF DIC TOTAL AND TSP DATA BY CITY SEASON
                                     CITY=TO   SEASON=WINT

           CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

          MASSTSP    SO4TSP     PBTSP     CRTSP     ASTSP      DATE  MASSDICT    ASDICT    CRDICT    PBDICT   SO4DICT

ASSTSP    1.00000  -0.29977   0.53051                      -0.43645   0.49130   0.00000   0.86529   0.04020  -0.53943
           0.0000    0.6241    0.1147                        0.2073    0.1792              0.0119    0.9247    0.2114
               10         5        10         0         0        10         9         2         7         8         7

4TSP     -0.29977   1.00000  -0.07394                       0.96832   0.72117             0.90221  -0.54652   1.00000
           0.6241    0.0000    0.9059                        0.0067    0.2788              0.2839    0.6319
                5         5         5         0         0         5         4         0         3         3         2

TSP       0.53051  -0.07394   1.00000                      -0.38317   0.69359   0.00000   0.42636   0.75186  -0.14512
           0.1147    0.9059    0.0000                        0.2744    0.0382              0.3401    0.0314    0.7562
               10         5        10         0         0        10         9         2         7         8         7

TSP

                0         0         0         0         0         0         0         0         0         0         0

TSP

                0         0         0         0         0         0         0         0         0         0         0

TE       -0.43645   0.96832  -0.38317                       1.00000  -0.07664   0.00000  -0.82402   0.27881   0.38906
           0.2073    0.0067    0.2744                        0.0000    0.8333    1.0000    0.0119    0.4675    0.3408
               10         5        10         0         0        11        10         3         8         9         8

SSDICT    0.49130   0.72117   0.69359                      -0.07664   1.00000   0.00000   0.08451   0.57627   0.38911
           0.1792    0.2788    0.0382                        0.8333    0.0000    1.0000    0.8423    0.1044    0.3407
                9         4         9         0         0        10        10         3         8         9         8

DICT      0.00000             0.00000                       0.00000   0.00000   0.00000   0.00000   0.00000   0.00000
                                                             1.0000    1.0000    1.0000    1.0000    1.0000    1.0000
                2         0         2         0         0         3         3         3         3         3         3

ICT       0.86529   0.90221   0.42636                      -0.82402   0.08451   0.00000   1.00000  -0.28592  -0.37639
           0.0119    0.2839    0.3401                        0.0119    0.8423    1.0000    0.0000    0.4924    0.4053
                7         3         7         C         0         8         8         3         8         8         7

ICT       0.04020  -0.54652   0.75186                       0.27881   0.57627   0.00000  -0.28592   1.00000  -0.05029
           0.9247    0.6319    0.0314                        0.4675    C.1044    1.0000    0.4924    0.0000    0.9059
                8         3         8         0         0         9         9         3         8         9         8

DICT     -0.53943   1.00000  -0.14512                       0.38906   0.38911   0.00000  -0.37639  -0.05029   1.00000
           0.2114              0.7562                        0.3408    0.3407    1.0000
                7         2         7         0
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                    CORRELATION ANALYSIS OF DIC TOTAL AND TSP DATA BY CITY
                                           CITY=WI

        CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

          MASSTSP    SO4TSP     PBTSP     CRTSP     ASTSP      DATE  MASSDICT    ASDICT    CRDICT    PBDICT   SO4DICT

SSTSP     1.00000  -0.00629   0.47719  -0.00693   0.32039  -0.44185   0.64602   0.52773   0.38908   0.29045  -0.01212
           0.0000    0.9816    0.0388    0.9775    0.1811    0.0582    0.0028    0.0638    0.1517    0.2423    0.9658
               19        16        19        19        19        19        19        13        15        18        15

4TSP     -0.00629   1.00000   0.03688   0.66259   0.24997   0.40528   0.06711   0.08847  -0.39953   0.17416   0.54188
           0.9816    0.0000    0.8921    0.0052    0.3504    0.1194    0.8050    0.8080    0.1982    0.5347    0.0688
               16        16        16        16        16        16        16        10        12        15        12

TSP       0.47719   0.03688   1.00000  -0.08540   0.04625  -0.09006   0.47417   0.57777   0.17814   0.81950  -0.05849
           0.0388    0.8921    0.0000    0.7281    0.8509    0.7139    0.0403    0.0386    0.5253    0.0001    0.8360
               19        16        19        19        19        19        19        13        15        18        15

TSP      -0.00693   0.66259  -0.08540   1.00000   0.35080   0.34937  -0.02332  -0.03405  -0.30734  -0.00852   0.12354
           0.9775    0.0052    0.7281    0.0000    0.1409    0.1426    0.9245    0.9121    0.2652    0.9732    0.6609
               19        16        19        19        19        19        19        13        15        18        15

TSP       0.32039   0.24997   0.04625   0.35080   1.00000   0.08516   0.34402  -0.11980   0.30431  -0.09151   0.13026
           0.1811    0.3504    0.8509    0.1409    0.0000    0.7289    0.1492    0.6967    0.2701    0.7180    0.6436
               19        16        19        19        19        19        19        13        15        18        15

TE       -0.44185   0.40528  -0.09006   0.34937   0.08516   1.00000  -0.08050  -0.24168  -0.21044   0.23038   0.39076
           0.0582    0.1194    0.7139    0.1426    0.7289    0.0000    0.7150    0.4052    0.4175    0.3151    0.1209
               19        16        19        19        19        23        23        14        17        21        17

SSDICT    0.64602   0.06711   0.47417  -0.02332   0.34402  -0.08050   1.00000   0.16561   0.36239   0.43292   0.01143
           0.0028    0.8050    0.0403    0.9245    0.1492    0.7150    0.0000    0.5715    0.1529    0.0500    0.9653
               19        16        19        19        19        23        23        14        17        21        17

DICT      0.52773   0.08847   0.57777  -0.03405  -0.11980  -0.24168   0.16561   1.00000   0.02835   0.56656   0.24520
           0.0638    0.8080    0.0386    0.9121    0.6967    0.4052    0.5715    0.0000    0.9380    0.0347    0.4674
               13        10        13        13        13        14        14        14        10        14        11

DICT      0.38908  -0.39953   0.17814  -0.30734   0.30431  -0.21044   0.36239   0.02835   1.00000  -0.19796  -0.12717
           0.1517    0.1982    0.5253    0.2652    0.2701    0.4175    0.1529    0.9380    0.0000    0.4463    0.6515
               15        12        15        15        15        17        17        10        17        17        15

DICT      0.29045   0.17416   0.81950  -0.00852  -0.09151   0.23038   0.43292   0.56656  -0.19796   1.00000   0.31998
           0.2423    0.5347    0.0001    0.9732    0.7180    0.3151    0.0500    0.0347    0.4463    0.0000    0.2105
               18        15        18        18        18        21        21        14        17        21        17

4DICT    -0.01212   0.54188  -0.05849   0.12354   0.13026   0.39076   0.01143   0.24520  -0.12717   0.31998   1.00000
           0.9658    0.0688    0.8360    0.6609    0.6436
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                CORRELATION ANALYSIS OF DIC TOTAL AND TSP DATA BY CITY SEASON
                                  CITY=WI    SEASON=FALL

       CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

        MASSTSP   SO4TSP    PBTSP     CRTSP     ASTSP      DATE MASSDICT   ASDICT    CRDICT    PBDICT  SO4DICT

SSTSP   1.00000   0.44495   0.62027   0.51484   0.61278 -0.26002  0.83188  0.51914  0.21514  0.58460  0.60241
         0.0000    0.2693    0.0418    0.1051    0.0450   0.4400   0.0015   0.1521   0.6089   0.0759   0.1523
             11         8        11        11        11       11       11        9        8       10        7

4TSP    0.44495   1.00000   0.70101  -0.05440   0.15936 -0.12969  0.41007  0.69427 -0.30302  0.66999  0.98449
         0.2693    0.0000    0.0527    0.8982    0.7062   0.7595   0.3130   0.1259   0.6202   0.0996   0.0155
              8         8         8         8         8        8        8        6        5        7        4

TSP     0.62027   0.70101   1.00000   0.31493   0.14689 -0.30458  0.36041  0.74276  0.03920  0.94160  0.44585
         0.0418    0.0527    0.0000    0.3455    0.6665   0.3625   0.2762   0.0219   0.9266   0.0001   0.3160
             11         8        11        11        11       11       11        9        8       10        7

TSP     0.51484  -0.05440   0.31493   1.00000   0.25877  0.16811  0.39289  0.23001 -0.08198  0.39356  0.29093
         0.1051    0.8982    0.3455    0.0000    0.4423   0.6212   0.2320   0.5516   0.8470   0.2605   0.5267
             11         8        11        11        11       11       11        9        8       10        7

TSP     0.61278   0.15936   0.14689   0.25877   1.00000  0.09546  0.82095 -0.16818  0.54698 -0.06630 -0.36580
         0.0450    0.7062    0.6665    0.4423    0.0000   0.7801   0.0020   0.6654   0.1606   0.8556   0.4197
             11         8        11        11        11       11       11        9        8       10        7

TE     -0.26002  -0.12969  -0.30458   0.16811   0.09546  1.00000 -0.13029 -0.19167  0.48704 -0.29402 -0.02594
         0.4400    0.7595    0.3625    0.6212    0.7801   0.0000   0.6714   0.5958   0.1836   0.3536   0.9472
             11         8        11        11        11       13       13       10        9       12        9

SSDICT  0.83188   0.41007   0.36041   0.39289   0.82095 -0.13029  1.00000  0.20791  0.36542  0.24171  0.31237
         0.0015    0.3130    0.2762    0.2320    0.0020   0.6714   0.0000   0.5643   0.3335   0.4491   0.4131
             11         8        11        11        11       13       13       10        9       12        9

ICT     0.51914   0.69427   0.74276   0.23001  -0.16818 -0.19167  0.20791  1.00000 -0.09597  0.86713  0.67302
         0.1521    0.1259    0.0219    0.5516    0.6654   0.5958   0.5643   0.0000   0.8378   0.0012   0.0975
              9         6         9         9         9       10       10       10        7       10        7

ICT     0.21514  -0.30302   0.03920  -0.08198   0.54698  0.48704  0.36542 -0.09597  1.00000 -0.22635  0.11889
         0.6089    0.6202    0.9266    0.8470    0.1606   0.1836   0.3335   0.8378   0.0000   0.5581   0.7792
              8         5         8         8         8        9        9        7        9        9        8

ICT     0.58460   0.66999   0.94160   0.39356  -0.06630 -0.29402  0.24171  0.86713 -0.22635  1.00000  0.58820
         0.0759    0.0996    0.0001    0.2605    0.8556   0.3536   0.4491   0.0012   0.5581   0.0000   0.0957
             10         7        10        10        10       12       12       10        9       12        9

DICT    0.60241   0.98449   0.44585   0.29093  -0.36580 -0.02594  0.31237  0.67302  0.11889  0.58820  1.00000
         0.1523    0.0155    0.3160    0.5267    0.4197   0.9472   0.4131   0.0975   0.7792   0.0957
              7         4         7         7         7
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                 CORRELATION ANALYSIS OF DIC TOTAL AND TSP DATA BY CITY SEASON
                                   CITY=WI    SEASON=WINT

          CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

          MASSTSP    SO4TSP     PBTSP     CRTSP     ASTSP      DATE MASSDICT    ASDICT    CRDICT    PBDICT   SO4DICT

ASSTSP    1.00000   0.41825   0.19023   0.07616  -0.05938  -0.37423   0.25111  -0.16362   0.16320   0.17079  -0.07089
           0.0000    0.3024    0.6518    0.8578    0.8889    0.3611    0.5486    0.8364    0.7266    0.6859    0.8675
                8         8         8         8         8         8         8         4         7         8         8

O4TSP     0.41825   1.00000  -0.19845   0.64744   0.30507  -0.70380  -0.12663  -0.57643   0.08640  -0.34414   0.42170
           0.3024    0.0000    0.6376    0.0826    0.4625    0.0514    0.7651    0.4236    0.8539    0.4039    0.2980
                8         8         8         8         8         8         8         4         7         8         8

BTSP      0.19023  -0.19845   1.00000  -0.25793  -0.06540   0.37654   0.68681   0.84602   0.17363   0.82961  -0.15580
           0.6518    0.6376    0.0000    0.5374    0.8777    0.3579    0.0599    0.1540    0.7097    0.0108    0.7126
                8         8         8         8         8         8         8         4         7         8         8

RTSP      0.07616   0.64744  -0.25793   1.00000   0.41195  -0.39209  -0.26390  -0.33333  -0.30387  -0.45526  -0.14795
           0.8578    0.0826    0.5374    0.0000    0.3105    0.3367    0.5277    0.6667    0.5076    0.2570    0.7266
                8         8         8         8         8         8         8         4         7         8         8

STSP     -0.05938   0.30507  -0.06540   0.41195   1.00000  -0.33645  -0.37586   0.52223   0.06206  -0.20722   0.19741
           0.8889    0.4625    0.8777    0.3105    0.0000    0.4151    0.3588    0.4778    0.8948    0.6224    0.6394
                8         8         8         8         8         8         8         4         7         8         8

ATE      -0.37423  -0.70380   0.37654  -0.39209  -0.33645   1.00000   0.31795   0.37582  -0.36957   0.65353  -0.14121
           0.3611    0.0514    0.3579    0.3367    0.4151    0.0000    0.3706    0.6242    0.3676    0.0563    0.7387
                8         8         8         8         8        10        10         4         8         9         9

ASSDICT   0.25111  -0.12663   0.68681  -0.26390  -0.37586   0.31795   1.00000   0.87108   0.06515   0.78352  -0.10285
           0.5486    0.7651    0.0599    0.5277    0.3588    0.3706    0.0000    0.1289    0.8782    0.0125    0.8085
                8         8         8         8         8        10        10         4         8         9         8

SDICT    -0.16362  -0.57643   0.84602  -0.33333   0.52223   0.37582   0.87108   1.00000   0.48379   0.76198  -0.32465
           0.8364    0.4236    0.1540    0.6667    0.4778    0.6242    0.1289    0.0000    0.6785    0.2380    0.6754
                4         4         4         4         4         4         4         4         3         4         4

DICT      0.16320   0.08640   0.17363  -0.30387   0.06206  -0.36957   0.06515   0.48379   1.00000  -0.20882  -0.19563
           0.7266    0.8539    0.7097    0.5076    0.8948    0.3676    0.8782    0.6785    0.0000    0.6197    0.6742
                7         7         7         7         7         8         8         3         8         8         7

DICT      0.17079  -0.34414   0.82961  -0.45526  -0.20722   0.65353   0.78352   0.76198  -0.20882   1.00000   0.10742
           0.6859    0.4039    0.0108    0.2570    0.6224    0.0563    0.0125    0.2380    0.6197    0.0000    0.8001
                8         8         8         8         8         9         9         4         8         9         8

DICT     -0.07089   0.42170  -0.15580  -0.14795   0.19741  -0.14121  -0.10285  -0.32465  -0.19563   0.10742   1.00000
           0.8675    0.2980    0.7126    0.7266    0.6394    0.7387    0.8085    0.6754    0.6742
                8         8         8         8
```

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                    CORRELATICN ANALYSIS OF DIC TOTAL AND TSP DATA BY CITY SEASCN
                                     CITY=ED   SEASON=FALL

          CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=C / NUMBER OF OBSERVATIONS

        MASSTSP     SO4TSP      PBTSP      CRTSP      ASTSP        DATE MASSDICT     ASDICT     CRDICT     PBDICT    SO4DICT

ASSTSP  1.00000                                               -0.12351   0.95086    0.07268    0.04592    0.82077  -0.45232
         0.0000                                                 0.6877    C.0001     0.8418     0.8873     0.0011    0.2215
             13          0          0          0          0         13        13         10         12         12         9
04TSP

              0          0          0          0          0          0         0          0          0          0         0
BTSP

              0          0          0          0          0          0         0          0          0          0         0
RTSP

              0          0          0          0          0          0         0          0          0          0         0
STSP

              0          0          0          0          0          0         0          0          0          0         0
ATE    -0.12351                                                1.00000  -0.01438   -0.28841   -0.13673    0.08623   0.49279
         0.6877                                                 0.0000    0.9628     0.4190     0.6718     0.7899    0.1777
             13          0          0          0          0         13        13         10         12         12         9
SSDICT  0.95086                                               -0.01438   1.00000    0.06347    0.02024    0.82913  -0.38366
         0.0001                                                 0.9628    0.0000     0.8617     0.9502     0.0009    0.3080
             13          0          0          0          0         13        13         10         12         12         9
SDICT   0.07268                                               -0.28841   0.06347    1.00000   -0.21001    0.05445  -0.46823
         0.8418                                                 0.4190    0.8617     0.0000     0.5603     0.8812    0.2893
             10          0          0          0          0         10        10         10         10         10         7
DICT    0.04592                                               -0.13673   0.02024   -C.21001    1.00000   -0.30555  -0.48915
         0.8873                                                 0.6718    C.9502     0.5603     0.0000     0.3341    0.1814
             12          0          0          0          0         12        12         10         12         12         9
DICT    0.82077                                                0.08623   0.82913    0.05445   -0.30555    1.00000  -0.20558
         0.0011                                                 0.7899    C.0009     0.8812     0.3341     0.0000    0.5957
             12          0          0          0          0         12        12         10         12         12         9
4DICT  -0.45232                                                0.49279  -0.38366   -0.46823   -0.48915   -0.20558   1.00000
         0.2215                                                 0.1777    C.3080     0.2893     0.1814     0.5957    0.0000
              9          0          0          0          0          9         9          7          9          9         9
```

```
                         CORRELATION ANALYSIS OF DIC TOTAL AND TSP DATA BY CITY
                                                CITY=ED

           CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

        MASSTSP    SO4TSP     PBTSP     CRTSP     ASTSP       DATE MASSDICT    ASDICT    CRDICT    PBDICT   SO4DICT

ASSTSP  1.00000                                           -0.54891  0.89226   0.07268   0.25208   0.44652  -0.30004
         0.0000                                             0.0122   0.0001    0.8418    0.3129    0.0632    0.2773
             20         0         0         0         0         20       20        10        18        18        15

4TSP

              0         0         0         0         0          0        0         0         0         0         0

TSP

              0         0         0         0         0          0        0         0         0         0         0

TSP

              0         0         0         0         0          0        0         0         0         0         0

TSP

              0         0         0         0         0          0        0         0         0         0         0

TE     -0.54891                                            1.00000 -0.30675  -0.28841  -0.40531   0.00590   0.17679
         0.0122                                             0.0000   0.1650    0.4190    0.0852    0.9803    0.4973
             20         0         0         0         0         23       22        10        19        20        17

SSDICT  0.89226                                           -0.30675  1.00000   0.06347   0.09910   0.56842  -0.32529
         0.0001                                             0.1650   0.0000    0.8617    0.6865    0.0089    0.2027
             20         0         0         0         0         22       22        10        19        20        17

DICT    0.07268                                           -0.28841  0.06347   1.00000  -0.21001   0.05445  -0.46823
         0.8418                                             0.4190   0.8617    0.0000    0.5603    0.8812    0.2893
             10         0         0         0         0         10       10        10        10        10         7

DICT    0.25208                                           -0.40531  0.09910  -0.21001   1.00000  -0.27216  -0.35700
         0.3129                                             0.0852   0.6865    0.5603    0.0000    0.2596    0.1747
             18         0         0         0         0         19       19        10        19        19        16

DICT    0.44652                                            0.00590  0.56842   0.05445  -0.27216   1.00000  -0.11659
         0.0632                                             0.9803   0.0089    0.8812    0.2596    0.0000    0.6559
             18         0         0         0         0         20       20        10        19        20        17

4DICT  -0.30004                                            0.17679 -0.32529  -0.46823  -0.35700  -0.11659   1.00000
         0.2773                                             0.4973   0.2027    0.2893    0.1747    0.6559    0.0000
             15         0         0         0         0         17       17
```

```
                 CORRELATION ANALYSIS OF DIC TOTAL AND TSP DATA BY CITY SEASON
                                   CITY=ED   SEASON=WINT

         CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

          MASSTSP    SO4TSP    PBTSP     CRTSP     ASTSP      DATE MASSDICT    ASDICT    CRDICT    PBDICT   SO4DICT

MASSTSP   1.00000                                         -0.33019  0.54284              0.34922  -0.40303  -0.40694
          0.0000                                           0.4695   0.2080               0.4975    0.4282    0.4233
                7         0         0         0         0        7        7         0        6         6         6

SO4TSP

                0         0         0         0         0        0        0         0        0         0         0

PBTSP

                0         0         0         0         0        0        0         0        0         0         0

CRTSP

                0         0         0         0         0        0        0         0        0         0         0

ASTSP

                0         0         0         0         0        0        0         0        0         0         0

DATE     -0.33019                                          1.00000  0.35261             -0.95454  -0.21638   0.00532
          0.4695                                           0.0000   0.3520               0.0008    0.6068    0.9900
                7         0         0         0         0       10        9         0        7         8         8

MASSDICT  0.54284                                          0.35261  1.00000             -0.38849  -0.20662  -0.28687
          0.2080                                           0.3520   0.0000               0.3891    0.6235    0.4909
                7         0         0         0         0        9        9         0        7         8         8

SDICT

                0         0         0         0         0        0        0         0        0         0         0

RDICT     0.34922                                         -0.95454 -0.38849              1.00000  -0.01466   0.28367
          0.4975                                           0.0008   0.3891               0.0000    0.9751    0.5376
                6         0         0         0         0        7        7         0        7         7         7

BDICT    -0.40303                                         -0.21638 -0.20662             -0.01466   1.00000   0.11243
          0.4282                                           0.6068   0.6235               0.9751    0.0000    0.7910
                6         0         0         0         0        8        8         0        7         8         8

O4DICT   -0.40694                                          0.00532 -0.28687              0.28367   0.11243   1.00000
          0.4233                                           0.9900   0.4909               0.5376    0.7910    0.0000
                6         0         0         0         0        8        8         0        7         8
```

```
                        CORRELATION ANALYSIS OF DIC TOTAL AND TSP DATA BY CITY
                                              CITY=VA

          CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

         MASSTSP    SO4TSP     PBTSP     CRTSP     ASTSP      DATE MASSDICT    ASDICT    CRDICT    PBDICT   SO4DICT

*SSTSP   1.00000   0.58311   0.83742                       -0.40250  0.95729  0.10241   0.84544   0.90046   0.74068
          0.0000    0.0001    0.0007                         0.1946   0.0001   0.8271    0.0021    0.0002    0.0091
              12        12        12         0         0        12       11        7        10        11        11

34TSP    0.88311   1.00000   0.83194                       -0.51379  0.78049  0.11617   0.69320   0.75328   0.48839
          0.0001    0.0000    0.0008                         0.0875   0.0046   0.8041    0.0262    0.0074    0.1274
              12        12        12         0         0        12       11        7        10        11        11

3TSP     0.83742   0.83194   1.00000                       -0.19418  0.87887 -0.27946   0.70032   0.90814   0.56949
          0.0007    0.0008    0.0000                         0.5454   0.0004   0.5439    0.0241    0.0001    0.0674
              12        12        12         0         0        12       11        7        10        11        11

ITSP

               0         0         0         0         0         0        0        0         0         0         0

TSP

               0         0         0         0         0         0        0        0         0         0         0

TE      -0.40250  -0.51379  -0.19418                        1.00000 -0.51109 -0.12400  -0.07925  -0.42644  -0.35602
          0.1946    0.0875    0.5454                         0.0000   0.0360   0.7164    0.7969    0.1129    0.1928
              12        12        12         0         0        23       17       11        13        15        15

SSDICT   0.95729   0.78049   0.87887                       -0.51109  1.00000 -0.22994   0.48304   0.94275   0.78584
          0.0001    0.0046    0.0004                         0.0360   0.0000   0.4964    0.0945    0.0001    0.0005
              11        11        11         0         0        17       17       11        13        15        15

)ICT     0.10241   0.11617  -0.27946                       -0.12400 -0.22994  1.00000  -0.21745  -0.29103  -0.29063
          0.8271    0.8041    0.5439                         0.7164   0.4964   0.0000    0.5741    0.3853    0.3859
               7         7         7         0         0        11       11       11         9        11        11

)ICT     0.84544   0.69320   0.70032                       -0.07925  0.48304 -0.21745   1.00000   0.27530   0.33181
          0.0021    0.0262    0.0241                         0.7969   0.0945   0.5741    0.0000    0.3626    0.2681
              10        10        10         0         0        13       13        9        13        13        13

)ICT     0.90046   0.75328   0.90814                       -0.42644  0.94275 -0.29103   0.27530   1.00000   0.76315
          0.0002    0.0074    0.0001                         0.1129   0.0001   0.3853    0.3626    0.0000    0.0009
              11        11        11         0         0        15       15       11        13        15        15

DICT     0.74068   0.48839   0.56949                       -0.35602  0.78586 -0.29063   0.33181   0.76315   1.00000
          0.0091    0.1274    0.0674                         0.1928   0.0005   0.3859    0.2681    0.0009    0.0000
              11        11        11         0         0        15       15       11        13        15        15
```

```
                    CORRELATION ANALYSIS OF DIC TOTAL AND TSP DATA BY CITY SEASON
                                    CITY=VA    SEASON=FALL

            CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

        MASSTSP    SO4TSP     PBTSP      CRTSP      ASTSP        DATE MASSDICT   ASDICT     CRDICT     PBDICT    SO4DICT

SSTSP   1.00000    0.84214    0.31108                           0.03325    0.96537    0.10241    0.89017    0.91993    0.67824
         0.0000     0.0044     0.0080                            0.9323     0.0001     0.8271     0.0072     0.0012     0.0645
              9          9          9          0          0           9          8          7          7          8          8

4TSP    0.84214    1.00000    0.81093                          -0.00887    0.72594    0.11617    0.69800    0.70283    0.31254
         0.0044     0.0000     0.0080                            0.9819     0.0415     0.8041     0.0812     0.0519     0.4510
              9          9          9          0          0           9          8          7          7          8          8

TSP     0.81108    0.81093    1.00000                           0.43704    0.84435   -0.27946    0.81063    0.86126    0.49838
         0.0080     0.0080     0.0000                            0.2395     0.0084     0.5439     0.0270     0.0060     0.2087
              9          9          9          0          0           9          8          7          7          8          8

SP

              0          0          0          0          0           0          0          0          0          0          0

SP

              0          0          0          0          0           0          0          0          0          0          0

E       0.03325   -0.00887    0.43704                           1.00000   -0.26014   -0.78090    0.28902   -0.02722   -0.09404
         0.9323     0.9819     0.2395                            0.0000     0.4142     0.0077     0.4507     0.9367     0.7833
              9          9          9          0          0          13         12         10          9         11         11

SDICT   0.96537    0.72594    0.84435                          -0.26014    1.00000   -0.04823    0.46071    0.93697    0.78433
         0.0001     0.0415     0.0084                            0.4142     0.0000     0.8947     0.2120     0.0001     0.0043
              8          3          8          0          0          12         12         10          9         11         11

ICT     0.10241    0.11617   -0.27946                          -0.78090   -0.04823    1.00000   -0.13997   -0.18341   -0.20692
         0.8271     0.8041     0.5439                            0.0077     0.8947     0.0000     0.7410     0.6120     0.5662
              7          7          7          0          0          10         10         10          8         10         10

ICT     0.89017    0.69800    0.81063                           0.28902    0.46071   -0.13997    1.00000    0.19279    0.22523
         0.0072     0.0812     0.0270                            0.4507     0.2120     0.7410     0.0000     0.6192     0.5601
              7          7          7          0          0           9          9          8          9          9          9

ICT     0.91993    0.70283    0.86126                          -0.02722    0.93697   -0.18341    0.19279    1.00000    0.78760
         0.0012     0.0519     0.0060                            0.9367     0.0001     0.6120     0.6192     0.0000     0.0040
              8          8          8          0          0          11         11         10          9         11         11

DICT    0.67824    0.31254    0.49838                          -0.09404    0.78433   -0.20692    0.22523    0.78760    1.00000
         0.0645     0.4510     0.2087                            0.7833     0.0043     0.5662     0.5601     0.0040     0.0000
              8          8          8          0          0          11         11         10
```

```
                    CORRELATION ANALYSIS OF DIC TOTAL AND TSP DATA BY CITY SEASON
                                          CITY=VA   SEASON=WINT

            CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS
         MASSTSP    SO4TSP     PBTSP     CRTSP     ASTSP      DATE MASSDICT    ASDICT    CRDICT    PBDICT   SO4DICT

ASSTSP   1.00000   0.86603  -0.88890                      -0.97289   0.01584              0.77534  -0.76188   0.90202
          0.0000    0.3333    0.3029                        0.1486    0.9899               0.4352    0.4486    0.2842
               3         3         3         0         0         3         3         0         3         3         3

04TSP    0.86603   1.00000  -0.99886                      -0.72690  -0.48622              0.98724  -0.98367   0.99702
          0.3333    0.0000    0.0304                        0.4819    0.6767               0.1018    0.1152    0.0492
               3         3         3         0         0         3         3         0         3         3         3

BTSP    -0.88890  -0.99886   1.00000                       0.75885   0.44396             -0.97851   0.97395  -0.99957
          0.3029    0.0304    0.0000                        0.4515    0.7071               0.1322    0.1456    0.0188
               3         3         3         0         0         3         3         0         3         3         3

RTSP

               0         0         0         0         0         0         0         0         0         0         0

STSP

               0         0         0         0         0         0         0         0         0         0         0

ATE     -0.97289  -0.72690   0.75885                       1.00000  -0.07787   0.00000  -0.54531   0.36160  -0.76070
          0.1486    0.4819    0.4515                        0.0000    0.9010               0.4547    0.6384    0.2393
               3         3         3         0         0        10         5         1         4         4         4

ASSDICT  0.01584  -0.48622   0.44396                      -0.07787   1.00000   0.00000  -0.62352   0.60629  -0.40782
          0.9899    0.6767    0.7071                        0.9010    C.0000               0.3765    0.3937    0.5922
               3         3         3         0         0         5         5         1         4         4         4

DICT                                                       0.00000   0.00000   1.00000   0.00000   0.00000   0.00000

               0         0         0         0         0         1         1         1         1         1         1

DICT     0.77534   0.98724  -0.97851                      -0.54531  -0.62352   0.00000   1.00000  -0.92943   0.95693
          0.4352    0.1018    0.1322                        0.4547    0.3765               0.0000    0.0706    0.0431
               3         3         3         0         0         4         4         1         4         4         4

DICT    -0.76188  -0.98367   0.97395                       0.36160   0.60629   0.00000  -0.92943   1.00000  -0.82196
          0.4486    0.1152    0.1456                        0.6384    0.3937               0.0706    0.0000    0.1780
               3         3         3         0         0         4         4         1         4         4         4

4DICT    0.90202   0.99702  -0.99957                      -0.76070  -0.40782   0.00000   0.95693  -0.82196   1.00000
          0.2842    0.0492    0.0188                        0.2393    0.5922               0.0431    0.1780    0.0000
               3         3         3         0         0         4         4         1         4         4
```

APPENDIX V

EPS SAMPLING PROTOCOL

GENERAL INSTRUCTIONS
FOR DICHOTOMOUS SAMPLER
OPERATION FOR ECCF
FINE PARTICULATE PROJECT

1. Sampling Frequency

All samples will be collected every sixth day from midnight to midnight on the same schedule as the NAPS high-volume samplers (see Table 1). The first sampling day is tentatively scheduled for September 6. The amount of time that filter samples are left sitting in the sampler in the field, both before and after the scheduled sampling day, should be kept to a minimum.

2. Loading New Filters into the Andersen Sampler

The 37 mm diameter Teflon filters are shipped from the contractor in nylon support rings for ease of loading and removal by the operator. The filters remain in these support rings at all times. Avoid touching the filter surface, the filters are very fragile.

Remove two filters and support rings from the supplied batch shipped to you. Do not remove filters from their protective petri dishes until you are ready to load them into the Andersen sampler.

The filter slide tray of the Andersen sampler is rectangular in shape, with one end beveled (see Fig. 1). The beveled end is inserted

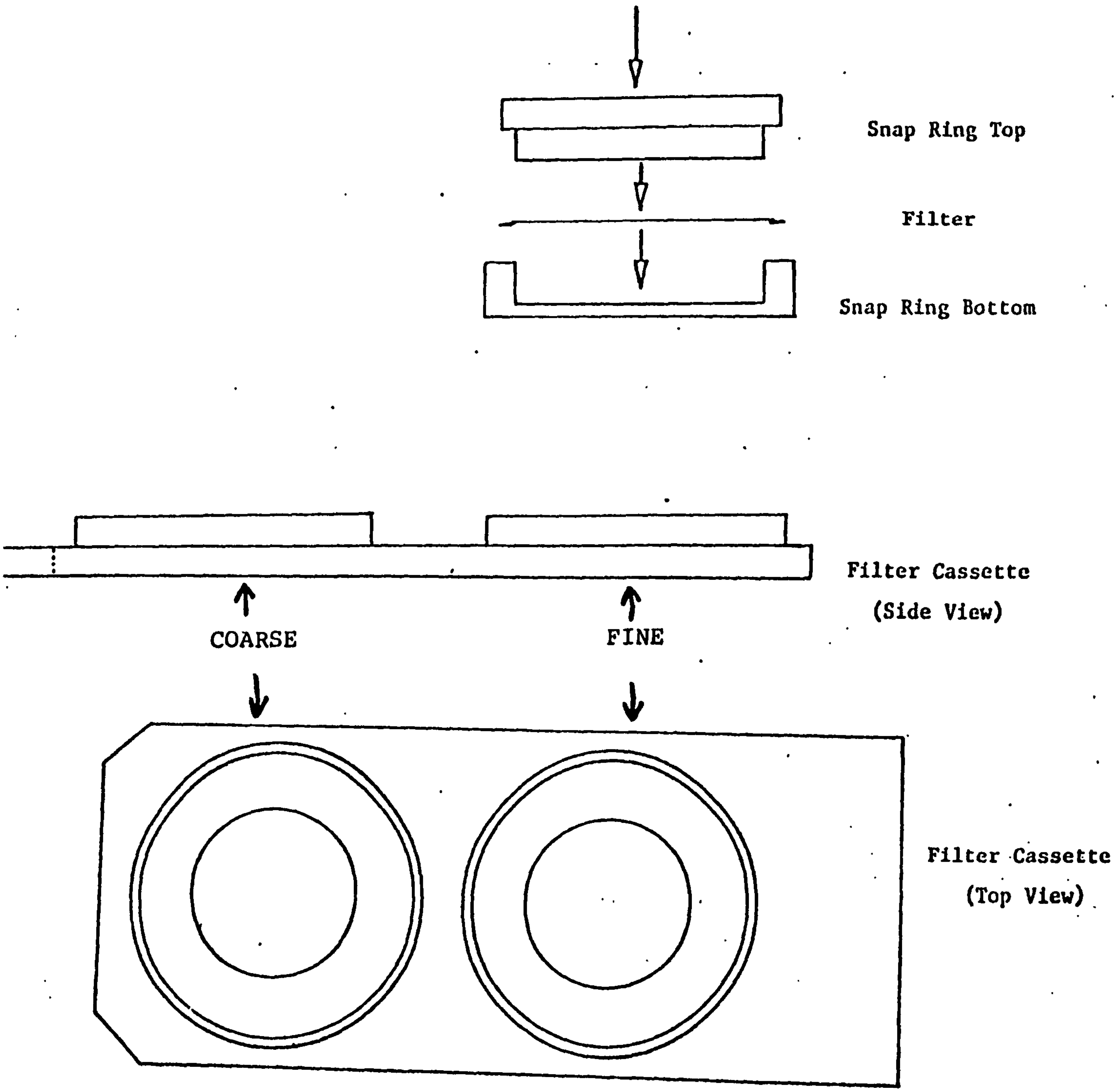
TABLE 1

NAPS HIGH VOLUME
SAMPLING SCHEDULE (1980-1981)

NAPS SAMPLE NO.	DATE
44	Thurs., Sept. 18
45	Wed., Sept. 24
46	Tues., Sept. 20
47	Mon., Oct. 6
48	Sun., Oct. 12
49	Sat., Oct. 18
50	Fri., Oct. 24
51	Thurs., Oct. 30
52	Wed., Nov. 5
53	Tues., Nov. 11
54	Mon., Nov. 17
55	Sun., Nov. 23
56	Sat., Nov. 29
57	Fri., Dec. 5
58	Thurs., Dec. 11
59	Wed., Dec. 17
60	Tues., Dec. 23
61	Mon., Dec. 29
1	Sun., Jan. 4, 1981
2	Sat., Jan. 10
3	Fri., Jan. 16
4	Thurs., Jan. 22
5	Wed., Jan. 28

Figure 1

ANDERSEN SAMPLER
FILTER CASSETTE



first and the tray is pushed fully into position. Place one filter and holder in the position closest to the beveled end. This filter will collect coarse particles and its identification number should be recorded in column 2 of the data sheet (COARSE FILTER NUMBER). Place the other filter and holder in position and record the filter number in column 3 of the data sheet (FINE FILTER NUMBER). This filter collects the fine particle fraction of the sample.

NOTE: It is essential that the fine and coarse filter ID numbers are recorded properly and are not interchanged. Double check before sealing the tray.

The filter tray is raised into collection position by rotating the handle counter-clockwise until firm pressure is applied to the support cartridges.

3. Setting Flow Rates

(a). Place the main power switch in the ON position. Place the status switch in the manual position (pump will start) and allow the sampler to run for approximately one minute.

(b). SETTING TOTAL FLOW RATE: Turn the total flow adjust valve until the total flow rotameter indicates a flow of 16.7 L/min (1.0 m^3/h) based on the flow calibration data sheet provided. The flow adjust valve should require, at most, only slight adjustment.

FINE PARTICULATE MONITORING PROJECT

DATA SHEET

L:

LOCATION:

SAMPLER S/N:

MONTH:

INITIAL FLOW RATES: Set COARSE rotameter at for 1.67 L/min

Set TOTAL rotameter at for 16.7 L/min.

COARSE Filter No.	FINE Filter No.	FINAL COARSE Rotameter Reading	Final Coarse Flow (m^3/h)	FINAL TOTAL Rotameter Reading	Final Total Flow (m^3/h)	Elapsed Time (h)	Pre-Sample Leak Check	Post-Sample Leak Check	Pressure Gauge (in.Hg)	REMARKS

Concord Scientific Corporation

.(c). SETTING COARSE FLOW RATE: Turn the coarse flow adjust valve until the coarse flow rotameter indicates a flow of 1.67 L/min (0.1 m^3/h) based on the flow calibration data sheet provided. The flow adjust valve should require, at most, only slight adjustment.

(d). Place the status switch in the OFF position.

4. Leak Checking the Sampler

Remove the aerosol inlet head from the impactor tube and set carefully in the protected area. Place the calibrator cap on the impactor tube and seal the inlet with the tygon tubing and hose clamp provided.

Place the status switch in the MANUAL position to activate the pump. The rotameter readings should go to zero and the 'SYSTEM VACUUM' gauge reading should exceed 20" Hg. Tighten fittings as required to achieve a leak free system. When all leaks have been eliminated place a check mark in the "PRE-SAMPLING LEAK CHECK" column of the data sheet. Return status switch to OFF Position.

Remove the calibrator cap and replace the aerosol inlet ensuring a proper connection.

5. Setting the Clock and Preparing for Sampling

Set correct time on dial by grasping dial and rotating clockwise until the correct day and time of day appear at the time point. Preset the sample start time by placing a silver tripper at 00.00 hours of the correct sample day. Preset the sample stop time by placing a dark tripper at 24.00 hours of the same sampling day.

Reset the elapsed timer to zero by depressing the black button on the timer. Set the status switch in the AUTO position. Turn pressure switch ON. Close and latch the two doors on the housing.

Place a plastic cover over the sampler, except for the inlet, as extra protection from moisture penetration.

6. Leak-Check and Flow-Check After Sampling

Before removing the exposed filter samples from the sampler perform the following steps:

1. Record the elapsed time in hours on the data sheet.

2. Set the status switch in the MANUAL position and allow pump to run for one minute. If pressure switch has triggered and terminated the sample make note on the data sheet and proceed to SECTION 7.

3. Record the coarse and total rotameter readings. Using the calibration data sheet provided determine the coarse and total flow rates and record on the data sheet. Record the pressure gauge reading. NOTE: If the sampler is operating properly, the final

flow rate should be within ± 3% of the original flow rate for pressure drops up to 15 in. Hg.

4. Perform a final leak check of the sampler as outlined in Section 4. If leaks are present make a note on the data sheet and record leakage rate registered on rotameters. After leak check place a check mark in the "POST-SAMPLING LEAK CHECK" column.

7. Removing Exposed Filter Samples

Lower the filter tray by rotating the latch clockwise. Carefully remove the filters and support holders and place them in the correctly coded petri dishes. As the filters are removed; double check that the filter codes for the coarse and fine sample correspond with those on the data sheet. Transport the filters with the exposed surface upright at all times.

Transport the samples in their petri dishes to a sheltered location and package for shipment according to the contractor's instructions.

8. Data Sheets

Ensure that all columns of data sheet are completed for each sampling day. A note should be made of any unusual adverse weather conditions or occurrences (e.g. high winds, rain, dust from construction, volcanoes, etc). At the end of each sampling month a completed data sheet should be sent to the contractor along with the filter samples.

9. Missing or Invalid Samples

If for any reason the samplers do not operate or if filters are damaged during handling, the sample filter numbers should be recorded on the data sheet and the appropriate note made. All filter samples must be returned to the contractor regardless of their validity.

10. Blank Samples

Once each month, one filter sample should be taken to the field and exposed to the ambient air for the same interval as a normal sample would. Record the filter number in the COARSE FILTER column and record BLANK in the FINE FILTER column. Return the filter to its petri dish and package with that month's samples for shipment.

11. Routine Maintenance

Follow the routine maintenance and cleaning instructions provided in the manual supplied with the Andersen sampler.

12. Rotameter Calibration

Every three months a verification of the rotameter calibration curves should be made following the instructions in the manual.

Government of Canada	Gouvernement du Canada

MEMORANDUM	**NOTE DE SERVICE**

SECURITY - CLASSIFICATION - DE SECURITE

OUR FILE/NOTRE RÉFÉRENCE 4231-4

YOUR FILE/VOTRE RÉFÉRENCE

DATE Oct. 15, 1980

SUBJECT OBJET ECCF FINE PARTICLE PROJECT - DICHOTOMOUS SAMPLER OPERATION

The following is a revision and/or an addition to the General Instructions for the Dichotomous Samplers operation for the ECCF Fine Particle Project.

Leak Checking the Sampler

Refer to sections 4 & 6 on pages 5 & 6 of the General Instructions and page 30 of the operating manual.

It has been decided that the leak check immediately after a sampling period should be discontinued. The leak check prior to a sampling period will served as the post leak check for the previous sampling period. This will eliminate the chance of losing particulate from a loaded filter due to a too-rapid vacuum release following a leak-check.

The procedure for leak checking is as follows: (refer to the typewritten note and changes on page 30 of the operating manual).

1. Remove the inlet assembly and the inlet extension tube.

2. Plug the impactor tube assembly with the rubber stopper (7 1/2) provided.

3. Place the status switch in the MANUAL position. The rotameter readings should go to zero and the system vacuum gauge reading should exceed -20" Hg, roughly -25" Hg.

4. Gently close the TOTAL flow valve and quickly shut off the pump. (If the pump is allowed to run with the flow valve shut, the pump could act as a compressor and can cause leaks). There will be an initial decrease in vacuum from -25" Hg to approx. -20" Hg to -15" Hg within a few seconds. This is not an external leak but is due to a small flow through the pneumatic feed-back line from the compressor to the vacuum side of the sy[illegible].

5. When satisfied that there are no leaks, slowly open the TOTAL flow valve. Do not remove the rubber stopper until the vacuum gauge reads zero.

Blank Samples

Refer to section 10, page 8 of the General Instructions. In addition to the following instructions in this section please record the amount of time in the SAMPLE DURATION column on the data sheet that the blank filters were exposed to the ambient air (one to three days would be an appropriate length of time).

Additional

During the idle period between sampling days, auxillary filters should be placed in the instrument to protect the screens on the impactor head. This applies only when the regular sampling filters are not in place prior to a sampling period and of course during the monthly blank check.

A calibration cap, a filter cassette and snap rings will be forwarded under separate cover when they become available.

If any explanation or assistance is required please contact me at (613) 998-4468.

Ross Sawyer

Ross Sawyer

RS:mu

cc: - T. Dann
- Concord Scientific Ltd.

Government of Canada
Gouvernement du Canada

MEMORANDUM **NOTE DE SERVICE**

SECURITY - CLASSIFICATION - DE SÉCURITÉ

OUR FILE/NOTRE RÉFÉRENCE 4231-4

YOUR FILE/VOTRE RÉFÉRENCE

DATE November 19, 1980

SUBJECT OBJET ECCF FINE PARTICLE PROJECT - DICHOTOMOUS SAMPLER OPERATION

The following facts have come to light regarding the operation of the dichotomous samplers and are being passed on in order that the necessary precautions may be taken with your samplers.

1. During the leak-checking procedure at some stations, particles have appeared on the coarse filter. It may be necessary to clean the components (inlet tube & virtual impactor assembly) more frequently especially in high deposition areas.

2. It has also been noticed that the screws holding the various components of the sampler to the chassis have become loose due to vibration of the instruments thus causing water due to rain or melted snow to seep in and end up on the filter or remain on the wall of the cone on the vitual impactor assembly. It is recommended that a periodic check be made of the screws.

If anyone has noticed any idiosyncrosies regarding the operation of their samplers, this office would appreciate hearing from you in order that the information may be passed along to other operators.

R. Sawyer

-S:mu
cc: - Concord Scientific
- T. Dann

APPENDIX VI

NAPS SAMPLING LOCATIONS

DOCUMENTATION ON NAPS NETWORK MONITORING STATIONS

DOCUMENTATION SUR LES STATIONS DU RÉSEAU SNPA

A. GENERAL INFORMATION/INFORMATIONS GÉNÉRALES

1. Station Identification/ Identification de la station:

30101
NAPS Station No./ N°. SNPA

Agency Station No./ N°. de station de l'organisme exploitant

2. Station Name/ Nom de la station:

NOVA SCOTIA TECHNICAL COLLEGE
Building Name, Park Name, etc./ Nom de l'immeuble, du parc, etc.

3. City/Ville:

Borough or Municipality Name/ Nom du quartier ou de la municipalité

HALIFAX, NOVA SCOTIA
City or Metropolitan Area Name/ Nom de la ville ou de la région métropolitaine

4. Station Address/ Adresse de la station:

BARRINGTON STREET
Street Number and Street Name/ N°. et nom de la rue

MORRIS STREET
Nearest Cross-Street/ Intersection la plus proche

5. Latitude and Longitude/ Latitude et Longitude:

443802
Latitude

0633427
Longitude

6. UTM Co-ordinates/ Coordonnées UTM:

0454.45
East/Est

4943.15
North/Nord

7. Population:

267,991
Pop. of Borough or Municipality/ Pop. du quartier ou de la municipalité

1976
Census Year/ Année de recensement

Pop. of City or Metropolitan Area/ Pop. de la ville ou de la région métropolitaine

Census Year/ Année de recensement

8. Operating Agency/ Organisme chargé de l'exploitation:

EPS ATLANTIC
Agency Name/Nom

C. WISEMAN
Operator's Name/ Nom de l'exploitant

426-6L32
Telephone/ Téléphone

9. Time Zone/ Fuseau horaire:

ATLANTIC HEURE DE L'ATLANTIQUE
Time Zone/Fuseau horaire

10. Date:

7001
Date Station Established/ Date de la mise sur pied de la station

8002
Date Information Last Updated/ Date de la dernière remise à jour des renseignements

NAPS NO. SNPA 30101

DOCUMENTATION ON NAPS NETWORK MONITORING STATIONS
DOCUMENTATION SUR LES STATIONS RESEAU SNPA

E. TOPOGRAPHIC MAP
E. CARTE TOPOGRAPHIQUE

Concord Scientific Corporation

DOCUMENTATION ON NAPS NETWORK MONITORING STATIONS

DOCUMENTATION SUR LES STATIONS DU RÉSEAU SNPA

A. GENERAL INFORMATION/INFORMATIONS GÉNÉRALES

1.	**Station Identification/ Identification de la station:**	50115 **NAPS Station No./ N°. SNPA**	61 **Agency Station No./ N°. de station de l'organisme exploitant**
2.	**Station Name/ Nom de la station:**	POSTE METRO **Building Name, Park Name, etc./ Nom de l'immeuble, du parc, etc.**	
3.	**City/Ville:**	**Borough or Municipality Name/ Nom du quartier ou de la municipalité**	
		MONTREAL, P.Q. **City or Metropolitan Area Name/ Nom de la ville ou de la région métropolitaine**	
4.	**Station Address/ Adresse de la station:**	RUE PEEL **Street Number and Street Name/ N°. et nom de la rue**	
		BOUL. DE MAISONNEUVE **Nearest Cross-Street/ Intersection la plus proche**	
5.	**Latitude and Longitude/ Latitude et Longitude:**	453003 **Latitude**	0733432 **Longitude**
6.	**UTM Co-ordinates/ Coordonnées UTM:**	0611.3 **East/Est**	5039.4 **North/Nord**
7.	**Population:**	**Pop. of Borough or Municipality/ Pop. du quartier ou de la municipalité**	**Census Year/ Année de recensement**
		2,802,485 **Pop. of City or Metropolitan Area/ Pop. de la ville ou de la région métropolitaine**	1976 **Census Year/ Année de recensement**
8.	**Operating Agency/ Organisme chargé de l'exploitation:**	COMMUNAUTE URBAINE DE MONTREAL **Agency Name/Nom**	
		R. ALLARD **Operator's Name/ Nom de l'exploitant**	872-2519 **Telephone/ Téléphone**
9.	**Time Zone/ Fuseau horaire:**	EASTERN **Time Zone/Fuseau horaire**	HEURE DE L'EST
10.	**Date:**	7703 **Date Station Established/ Date de la mise sur pied de la station**	8002 **Date Information Last Updated/ Date de la dernière remise à jour des renseignements**

NAPS NO. SNAP 50115

DOCUMENTATION ON NAPS NETWORK MONITORING STATIONS
DOCUMENTATION SUR LES STATIONS RÉSEAU SNAP

E. TOPOGRAPHIC MAP

E. CARTE TOPOGRAPHIQUE

DOCUMENTATION ON NAPS NETWORK MONITORING STATIONS

DOCUMENTATION SUR LES STATIONS DU RÉSEAU SNPA

A. GENERAL INFORMATION/INFORMATIONS GÉNÉRALES

1. Station Identification/
Identification de la station:
60101
NAPS Station No./
N°. SNPA
Agency Station No./
N°. de station de l'organisme exploitant

2. Station Name/
Nom de la station:
HYDRO BLDG.
Building Name, Park Name, etc./
Nom de l'immeuble, du parc, etc.

3. City/Ville:
OTTAWA, ONT.
Borough or Municipality Name/
Nom du quartier ou de la municipalité
OTTAWA-HULL
City or Metropolitan Area Name/
Nom de la ville ou de la région métropolitaine

4. Station Address/
Adresse de la station:
88 SLATER STREET
Street Number and Street Name/
N°. et nom de la rue
ELGIN
Nearest Cross-Street/
Intersection la plus proche

5. Latitude and Longitude/
Latitude et Longitude:
45 25 16
Latitude
075 41 42
Longitude

6. UTM Co-ordinates/
Coordonnées UTM:
0445.6
East/Est
5029.75
North/Nord

7. Population:
304,462
Pop. of Borough or Municipality/
Pop. du quartier ou de la municipalité
1976
Census Year/
Année de recensement
693,288
Pop. of City or Metropolitan Area/
Pop. de la ville ou de la région métropolitaine
1976
Census Year/
Année de recensement

8. Operating Agency/
Organisme chargé de l'exploitation:
ENVIRONMENT CANADA - EPS - SPE
Agency Name/Nom
P. BRADT
Operator's Name/
Nom de l'exploitant
998-8323
Telephone/
Téléphone

9. Time Zone/
Fuseau horaire:
EASTERN HEURE DE L'EST
Time Zone/Fuseau horaire

10. Date:
6801
Date Station Established/
Date de la mise sur pied de la station
8001
Date Information Last Updated/
Date de la dernière remise à jour des renseignements

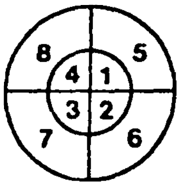
DOCUMENTATION ON NAPS NETWORK MONITORING STATIONS
DOCUMENTATION SUR LES STATIONS DU RÉSEAU SNPA

C. SITE DESCRIPTION/DESCRIPTION DE L'EMPLACEMENT

1. Scale of Representativeness/ Échelle de représentativité: MIDDLE DISTANCES MOYENNE

2. Land Use by Sector (see map)/ Utilisation des terres par secteur: (voir la carte)

1	C2	5	C2
2	C2	6	C2
3	C2	7	C2
4	C2	8	C2



3. Site Elevation (above sea level)/ Altitude: 85 m

4. Angle of Elevation to Nearby Buildings/ Angle d'élévation des immeubles les plus proches:
   1. Greatest Angle/ Angle le plus grand: 70°
   2. Building Direction/ Direction de l'immeuble: 90°

5. Average Building Height in Area/ Hauteur moyenne des immeubles du voisinage: 40 m

6. Airflow Restrictions (Yes/No)/ Obstacles à la circulation de l'air: (oui/non)
   - North/ Nord: NO
   - South/ Sud: YES
   - East/ Est: YES
   - West/ Ouest: NO

7. Distance to Nearest Trees/ Distance jusqu'aux arbres les plus proches: NONE m

8. Manifold/ Tuyauterie d'admission:
   1. Type: 1) TEFLON TUBING 8MM(NO$_2$ + CO
      2) GLASS 5 CM (O$_3$)
   2. Distance from Supporting Structure/ Distance de la structure portante: 2 M FROM VERTICAL WALL

9. Meteorological Information/ Renseignements Météorologiques:
   1. Type: COMPLETE INFORMATION
   2. Address/Adresse: OTTAWA WEATHER OFFICE
      A.E.S. 50 AIRPORT RD.
      OTTAWA K1V 9B4
   3. Distance from station/ Distance de la station: 11 km
   4. Contact/ Personne à contacter: OTTAWA WEATHER OFFICE 998-3439

DOCUMENTATION ON NAPS NETWORK MONITORING STATIONS
DOCUMENTATION SUR LES STATIONS DU RÉSEAU SNPA

D. SITE INFLUENCES/EFFETS DE L'EMPLACEMENT

1. Localized Sources/Source Locales:
(within 200 m of monitor)/(à moins de 200 m du détecteur)

Type	Distance (m)	Description
OFFICE BLDG.	100 (270°)	HEATING
OFFICE BLDG.	100 (315°)	HEATING
OFFICE BLDG.	100 (90°)	HEATING

2. Roadway Influences/Effets des routes:

Name/Nom	Type	Traffic Volume/ Intensité de la circulation	Distance (m)	Direction (degrees/degrés)
SLATER ST.	MAJOR ARTERY	10,000	5 (NO_2 & CO)	315
			25 (SO_2 & O_3)	315

3. Major Point Sources/Principales sources ponctuelles:

Map No./ N°. de la carte	Source Name/ Nom de la source	Source Type/ Type de source	Production Capacity/ Capacité de production	Distance from Site (km)/ Distance de l'emplacement (km)	Compass Direction (degrees)/ Direction (degrés)
1	E.B. EDDY	PAPER MILL		2	270
2	FED. GOVT.	POWER PLANT		1	270

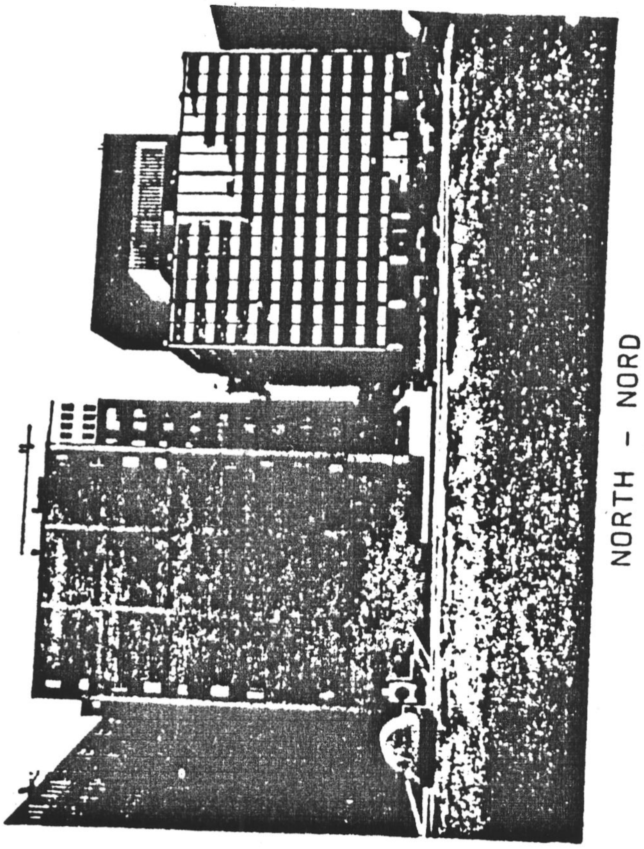
DOCUMENTATION ON NAPS NETWORK MONITORING STATIONS
DOCUMENTATION SUR LES STATIONS RÉSEAU SNPA

E. TOPOGRAPHIC MAP
E. CARTE TOPOGRAPHIQUE

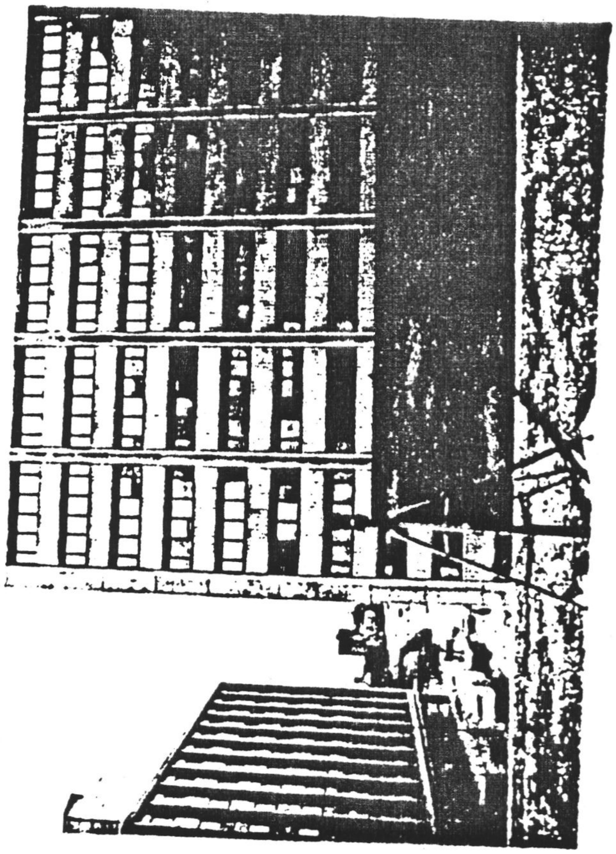
DOCUMENTATION ON NAPS NETWORK MONITORING STATIONS
DOCUMENTATION SUR LES STATIONS DU RÉSEAU SNPA

F. PHOTOGRAPHS (FROM INLET)

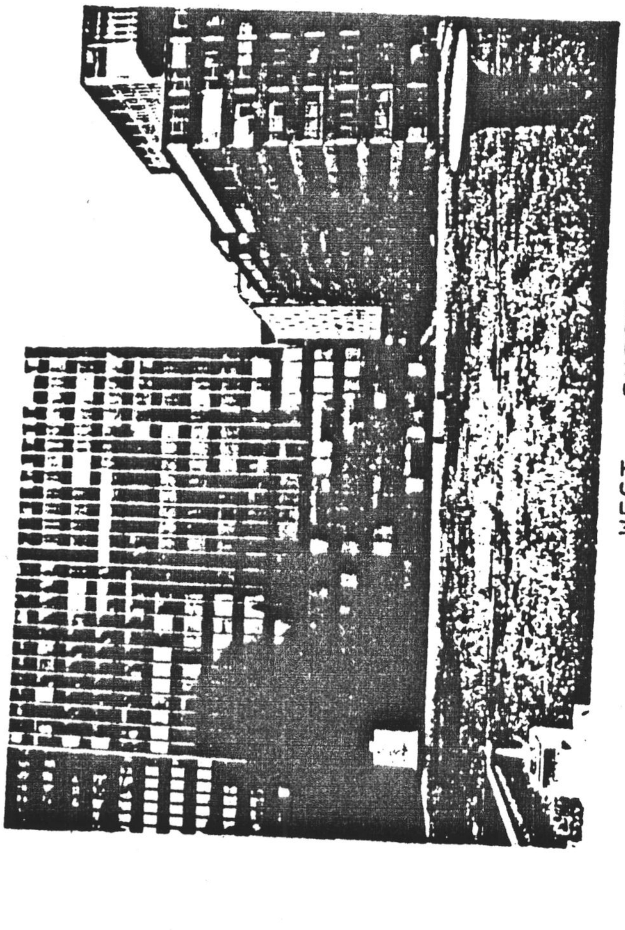
F. PHOTOGRAPHIES (PRISES DE L'ORIFICE D'ADMISSION)



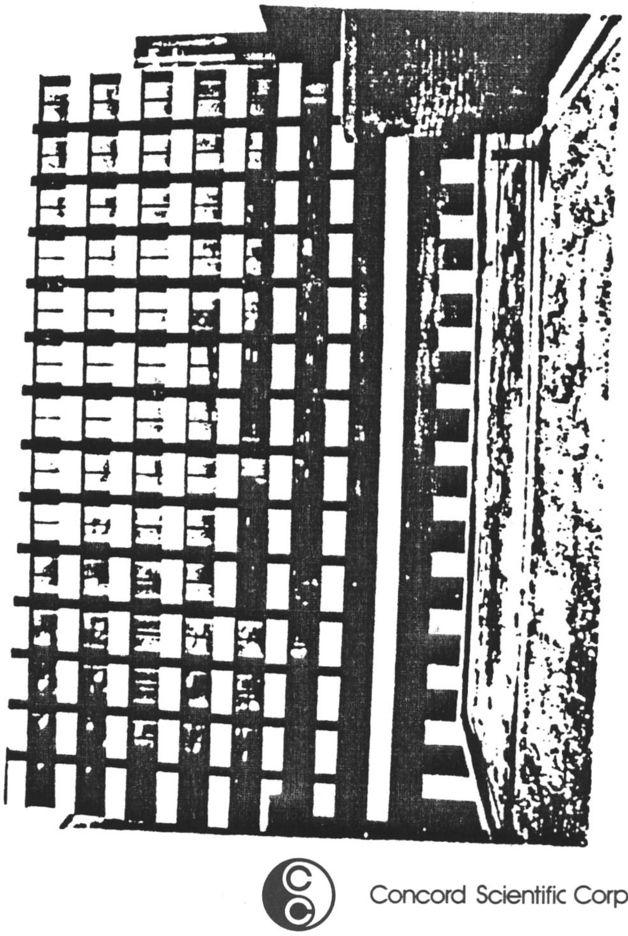
NORTH - NORD



EAST - EST



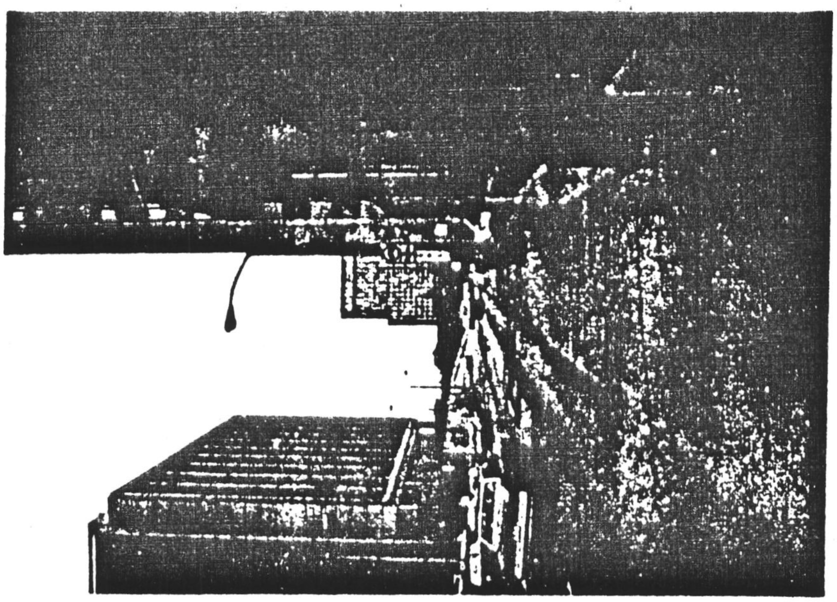
WEST - OUEST

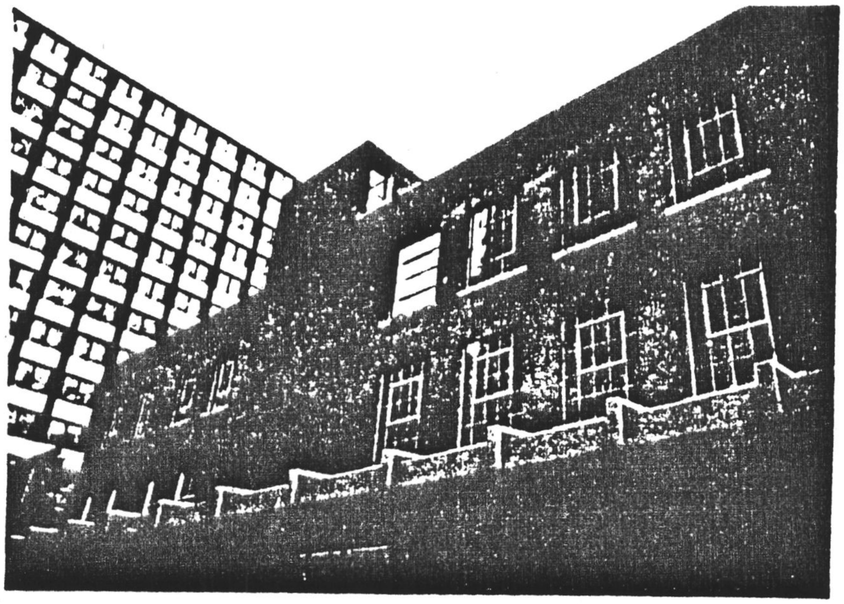


SOUTH - SUD

DOCUMENTATION ON NAPS NETWORK MONITORING STATIONS
DOCUMENTATION SUR LES STATIONS DU RÉSEAU SNPA

G. PHOTOGRAPHS (STATION)
G. PHOTOGRAPHIES (DE LA STATION)





DOCUMENTATION ON NAPS NETWORK MONITORING STATIONS

DOCUMENTATION SUR LES STATIONS DU RÉSEAU SNPA

A. GENERAL INFORMATION/INFORMATIONS GÉNÉRALES

1. Station Identification/ Identification de la station:

60401 — NAPS Station No./ N°. SNPA

31001 — Agency Station No./ N°. de station de l'organisme exploitant

2. Station Name/ Nom de la station:

________ — Building Name, Park Name, etc./ Nom de l'immeuble, du parc, etc.

3. City/Ville:

________ — Borough or Municipality Name/ Nom du quartier ou de la municipalité

TORONTO, ONTARIO — City or Metropolitan Area Name/ Nom de la ville ou de la région métropolitaine

4. Station Address/ Adresse de la station:

67 COLLEGE STREET — Street Number and Street Name/ N°. et nom de la rue

BAY STREET — Nearest Cross-Street/ Intersection la plus proche

5. Latitude and Longitude/ Latitude et Longitude:

433938 — Latitude

0792311 — Longitude

6. UTM Co-ordinates/ Coordonnées UTM:

0630.15 — East/Est

4835.2 — North/Nord

7. Population:

________ — Pop. of Borough or Municipality/ Pop. du quartier ou de la municipalité

________ — Census Year/ Année de recensement

2,803,101 — Pop. of City or Metropolitan Area/ Pop. de la ville ou de la région métropolitaine

1976 — Census Year/ Année de recensement

8. Operating Agency/ Organisme chargé de l'exploitation:

ONT. MINISTRY OF ENVIRONMENT — Agency Name/Nom

L. CHARBONNEAU — Operator's Name/ Nom de l'exploitant

965-2120 — Telephone/ Téléphone

9. Time Zone/ Fuseau horaire:

EASTERN HEURE DE L'EST — Time Zone/Fuseau horaire

10. Date:

7012 — Date Station Established/ Date de la mise sur pied de la station

8002 — Date Information Last Updated/ Date de la dernière remise à jour des renseignements

NAPS NO. SNPA 60401

DOCUMENTATION ON NAPS NETWORK MONITORING STATIONS
DOCUMENTATION SUR LES STATIONS RÉSEAU SNPA

E. TOPOGRAPHIC MAP
E. CARTE TOPOGRAPHIQUE

Concord Scientific Corporation

DOCUMENTATION ON NAPS NETWORK MONITORING STATIONS

DOCUMENTATION SUR LES STATIONS DU RÉSEAU SNPA

A. GENERAL INFORMATION/INFORMATIONS GÉNÉRALES

1\. Station Identification/
Identification de la station:

70119
NAPS Station No./
N°. SNPA

9119
Agency Station No./
N°. de station de l'organisme exploitant

2\. Station Name/
Nom de la station:

DEDICATED TRAILER NEAR CITY OF WINNIPEG
Building Name, Park Name, etc./
Nom de l'immeuble, du parc, etc.

3\. City/Ville:

INNER CITY (CENTENNIAL)
Borough or Municipality Name/
Nom du quartier ou de la municipalité

WINNIPEG, MANITOBA
City or Metropolitan Area Name/
Nom de la ville ou de la région métropolitaine

4\. Station Address/
Adresse de la station:

65 ELLEN STREET
Street Number and Street Name/
N°. et nom de la rue

NOTRE DAME
Nearest Cross-Street/
Intersection la plus proche

5\. Latitude and Longitude/
Latitude et Longitude:

43 53 49
Latitude

097 08 48
Longitude

6\. UTM Co-ordinates/
Coordonnées UTM:

06 33.L
East/Est

5528.725
North/Nord

7\. Population:

Pop. of Borough or Municipality/
Pop. du quartier ou de la municipalité

Census Year/
Année de recensement

570,725
Pop. of City or Metropolitan Area/
Pop. de la ville ou de la région métropolitaine

1976
Census Year/
Année de recensement

8\. Operating Agency/
Organisme chargé de l'exploitation:

MANITOBA-DEPT. OF CONSUMER & CORPORATE AFFAIRS & ENVIRONMENT
Agency Name/Nom

F. RIDDLE
Operator's Name/
Nom de l'exploitant

(204) 895-5297
Telephone/
Téléphone

9\. Time Zone/
Fuseau horaire:

CENTRAL HEURE DU CENTRE
Time Zone/Fuseau horaire

10\. Date:

7712
Date Station Established/
Date de la mise sur pied de la station

80 12
Date Information Last Updated/
Date de la dernière remise à jour des renseignements

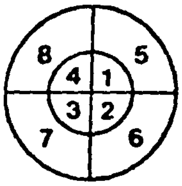
DOCUMENTATION ON NAPS NETWORK MONITORING STATIONS
DOCUMENTATION SUR LES STATIONS DU RÉSEAU SNPA

C. SITE DESCRIPTION/DESCRIPTION DE L'EMPLACEMENT

1. Scale of Representativeness/ Échelle de représentativité: NEIGHBOURHOOD VOISINAGE

2. Land Use by Sector (see map)/ Utilisation des terres par secteur: (voir la carte)

1	I2	5	I2
2	I2	6	C2
3	C2	7	C2
4	I1	8	C2-I1



3. Site Elevation (above sea level)/ Altitude: 235 m

4. Angle of Elevation to Nearby Buildings/ Angle d'élévation des immeubles les plus proches:
   1. Greatest Angle/ Angle le plus grand: 5 °
   2. Building Direction/ Direction de l'immeuble: 180 °

5. Average Building Height in Area/ Hauteur moyenne des immeubles du voisinage: 10 m

6. Airflow Restrictions (Yes/No)/ Obstacles à la circulation de l'air: (oui/non)
   North/ Nord: NO
   South/ Sud: YES
   East/ Est: NO
   West/ Ouest: NO

7. Distance to Nearest Trees/ Distance jusqu'aux arbres les plus proches: 5-8 m

8. Manifold/ Tuyauterie d'admission:
   1. Type: GLASS (5 CM DIAMETER)
   2. Distance from Supporting Structure/ Distance de la structure portante: 1 METER ABOVE ROOF

9. Meteorological Information/ Renseignements Météorologiques:
   1. Type: COMPLETE INFORMATION
   2. Address/Adresse: WINNIPEG INTERNATIONAL AIRPORT
   3. Distance from station/ Distance de la station: 5.7km
   4. Contact/ Personne à contacter: ATMOSPHERIC ENVIRONMENT SERVICE, 1000-266 GRAHAM AVENUE, WINNIPEG, MAN.

DOCUMENTATION ON NAPS NETWORK MONITORING STATIONS
DOCUMENTATION SUR LES STATIONS DU RÉSEAU SNPA

D. SITE INFLUENCES/EFFETS DE L'EMPLACEMENT

1. Localized Sources/Source Locales:
(within 200 m of monitor)/(à moins de 200 m du détecteur)

Type	Distance (m)	Description
NONE		

2. Roadway Influences/Effets des routes:

Name/Nom	Type	Traffic Volume/ Intensité de la circulation	Distance (m)	Direction (degrees/degrés)
NOTRE DAME	MULTILANE (MAJOR)	13,000	55	180
DAGMAR	2-LANE (SIDE)	850	7	90

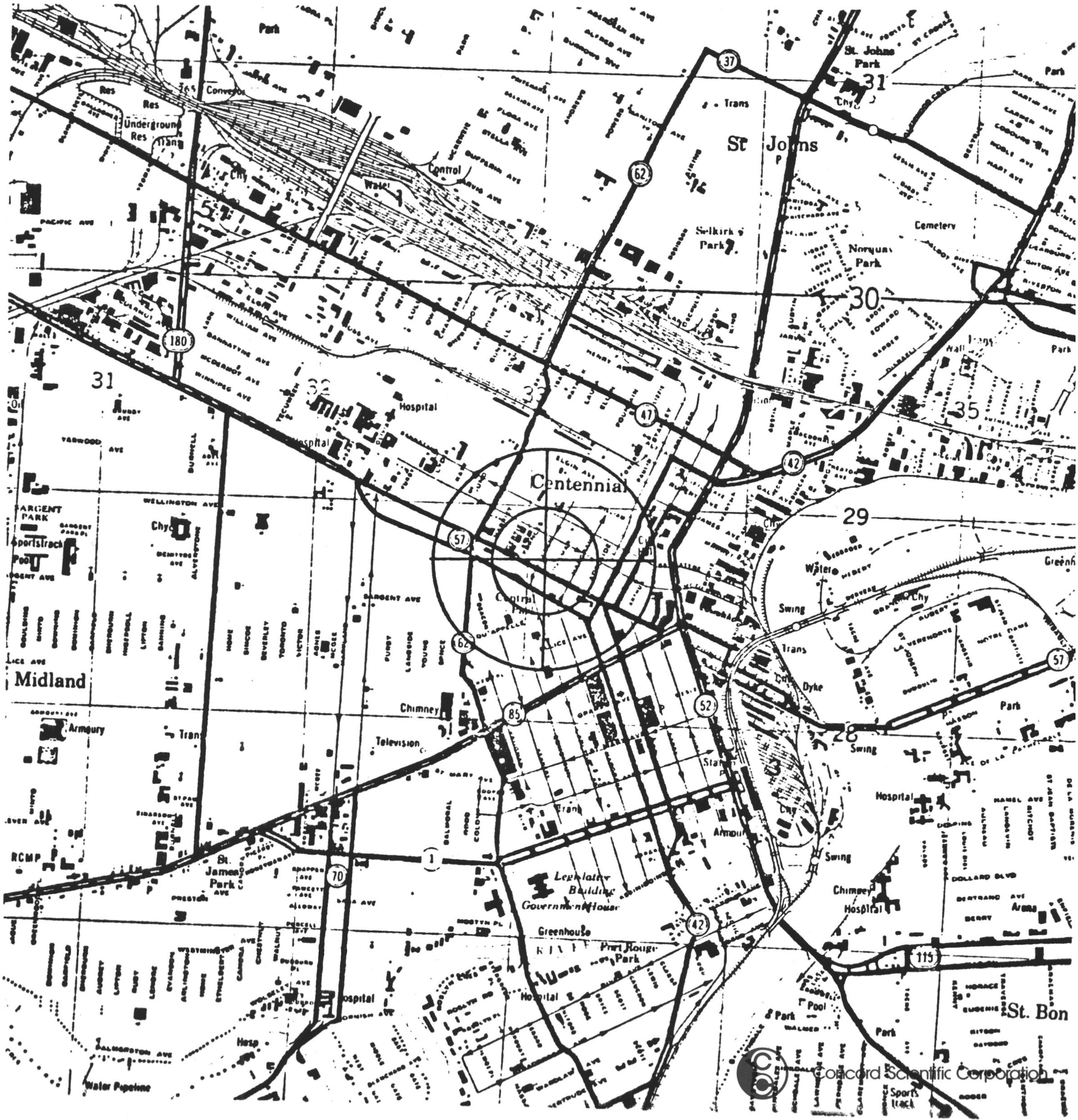
3. Major Point Sources/Principales sources ponctuelles:

Map No./ N°. de la carte	Source Name/ Nom de la source	Source Type/ Type de source	Production Capacity/ Capacité de production	Distance from Site (km)/ Distance de l'emplacement (km)	Compass Direction (degrees)/ Direction (degrés)
1	CP RAIL	RAILROAD YARDS		1.8	330-20
2	CITY OF WINNIPEG	THERMAL STEAM PLANT	0.7 BILLIONS POUNDS STEAM PER YEAR OCT.-MAY	1.0	70
3	CN RAIL	RAILROAD YARDS	POWER PLANT THERMAL TRUCK WAREHOUSEING	1.4	130
4	POINT DOUGLAS INDUSTRIAL AREA	GRAIN HANDLING, SCRAP YARDS, BUILDING MATERIAL YARD, HEAVY TRUCK TRAFFIC		2.3	75
5	INDUSTRIAL AREA	MALT PLANT AGGREGATE PLANTS, MUNICIPAL		2.4	

NAPS NO. SNPA 70119

DOCUMENTATION ON NAPS NETWORK MONITORING STATIONS
DOCUMENTATION SUR LES STATIONS RÉSEAU SNPA

E. TOPOGRAPHIC MAP
E. CARTE TOPOGRAPHIQUE

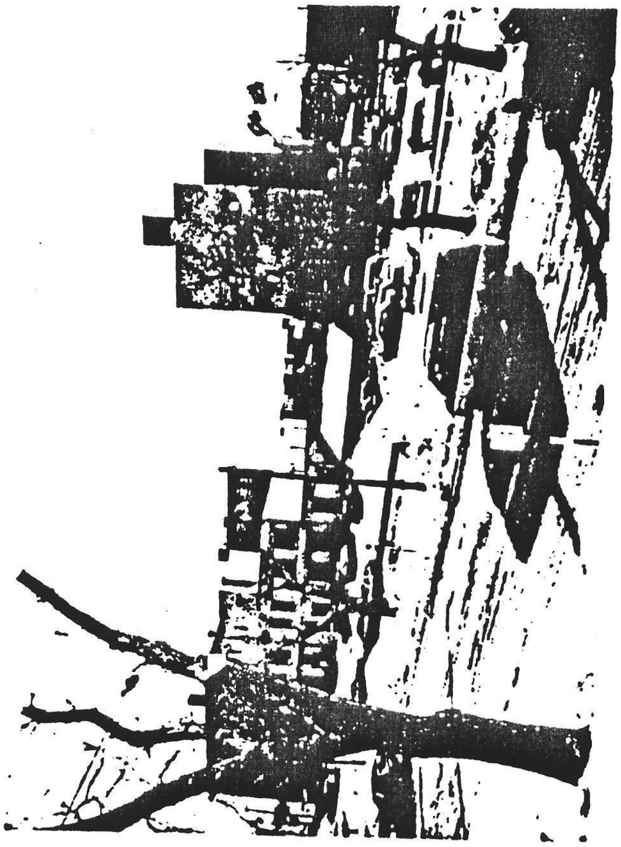


NAPS NO. SNPA 70119

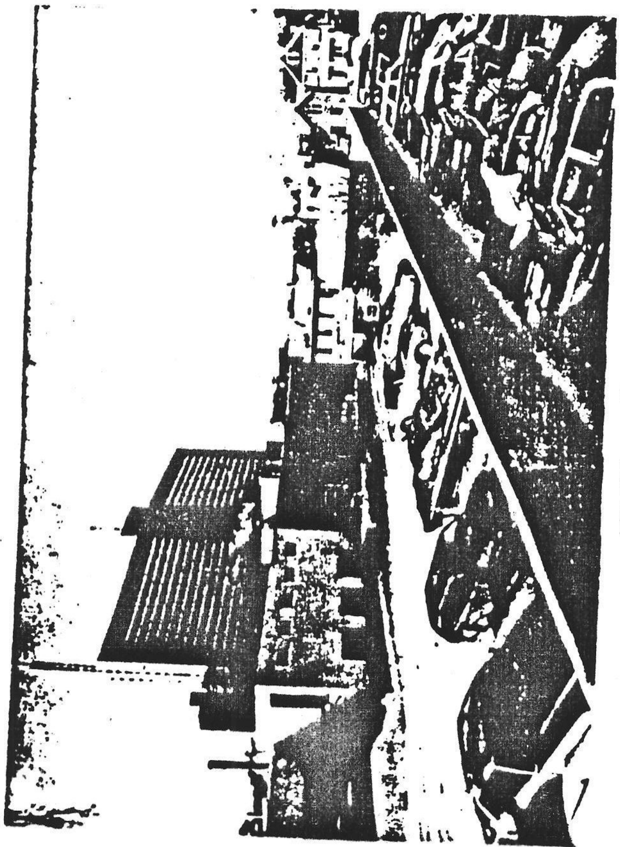
DOCUMENTATION ON NAPS NETWORK MONITORING STATIONS
DOCUMENTATION SUR LES STATIONS DU RÉSEAU SNPA

F. PHOTOGRAPHS (FROM INLET)
F. PHOTOGRAPHIES (PRISES DE L'ORIFICE D'ADMISSION)

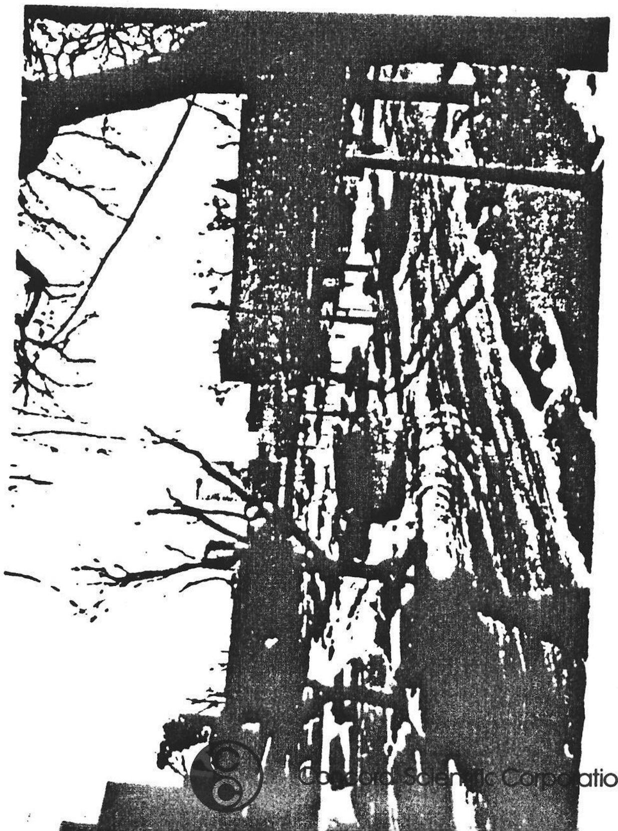
NORTH - NORD



EAST - EST



WEST - OUEST

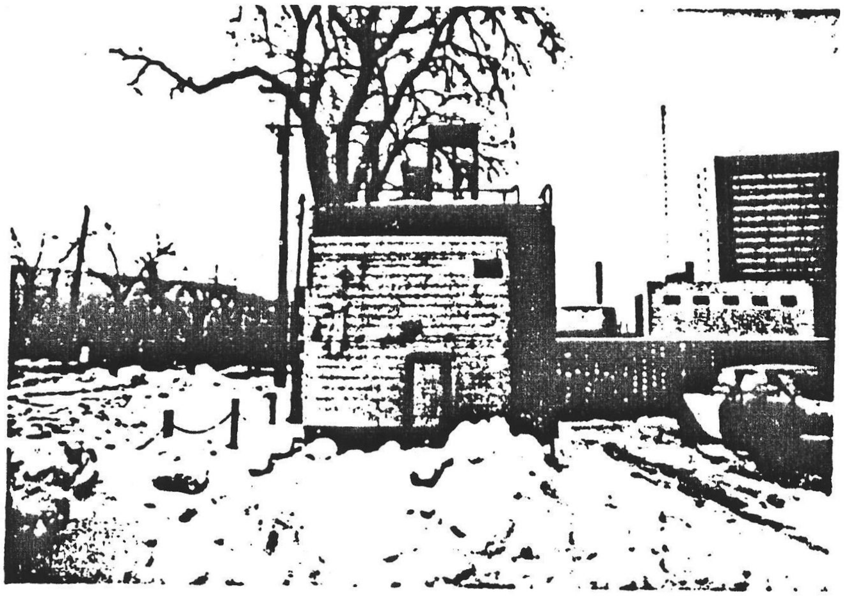


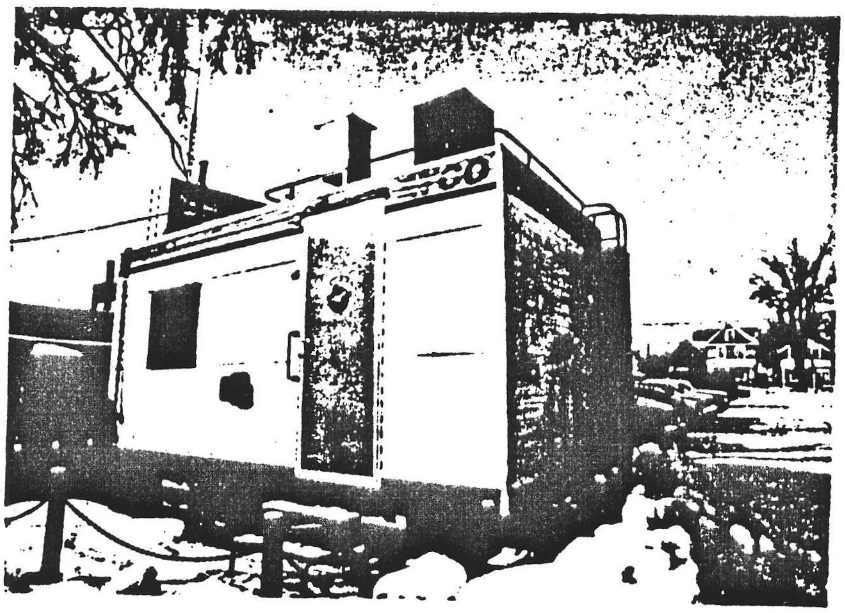
SOUTH - SUD

NAPS NO. SNPA 10119

DOCUMENTATION ON NAPS NETWORK MONITORING STATIONS
DOCUMENTATION SUR LES STATIONS DU RÉSEAU SNPA

G. PHOTOGRAPHS (STATION)
G. PHOTOGRAPHIES (DE LA STATION)





DOCUMENTATION ON NAPS NETWORK MONITORING STATIONS

DOCUMENTATION SUR LES STATIONS DU RÉSEAU SNPA

A. GENERAL INFORMATION/INFORMATIONS GÉNÉRALES

1. Station Identification/ Identification de la station:
   90130 — NAPS Station No./ N°. SNPA
   EDMU — Agency Station No./ N°. de station de l'organisme exploitant

2. Station Name/ Nom de la station:
   EDMONTON DOWNTOWN MONITORING UNIT — Building Name, Park Name, etc./ Nom de l'immeuble, du parc, etc.

3. City/Ville:
   Borough or Municipality Name/ Nom du quartier ou de la municipalité
   EDMONTON, ALBERTA — City or Metropolitan Area Name/ Nom de la ville ou de la région métropolitaine

4. Station Address/ Adresse de la station:
   10255-104 ST. — Street Number and Street Name/ N°. et nom de la rue
   103 AVE. — Nearest Cross-Street/ Intersection la plus proche

5. Latitude and Longitude/ Latitude et Longitude:
   53 32 38 — Latitude
   113 29 50 — Longitude

6. UTM Co-ordinates/ Coordonnées UTM:
   0334.525 — East/Est
   5935.5 — North/Nord

7. Population:
   Pop. of Borough or Municipality/ Pop. du quartier ou de la municipalité
   Census Year/ Année de recensement
   554,228 — Pop. of City or Metropolitan Area/ Pop. de la ville ou de la région métropolitaine
   1976 — Census Year/ Année de recensement

8. Operating Agency/ Organisme chargé de l'exploitation:
   ALBERTA ENVIRONMENT - AQCB — Agency Name/Nom
   DON KUPINA — Operator's Name/ Nom de l'exploitant
   427-5893 — Telephone/ Téléphone

9. Time Zone/ Fuseau horaire:
   MOUNTAIN — HEURE DES ROCHEUSES — Time Zone/Fuseau horaire

10. Date:
   7612 — Date Station Established/ Date de la mise sur pied de la station
   7904 — Date Information Last Updated/ Date de la dernière remise à jour des renseignements

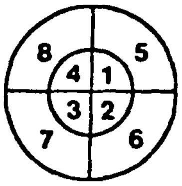
DOCUMENTATION ON NAPS NETWORK MONITORING STATIONS
DOCUMENTATION SUR LES STATIONS DU RÉSEAU SNPA

C. SITE DESCRIPTION/DESCRIPTION DE L'EMPLACEMENT

1. Scale of Representativeness/ Échelle de représentativité: MIDDLE DISTANCES MOYENNE

2. Land Use by Sector (see map)/ Utilisation des terres par secteur: (voir la carte)

1	C2	5	C2
2	C2	6	C2
3	C2	7	C2
4	C2	8	C2



3. Site Elevation (above sea level)/ Altitude: 667.5m

4. Angle of Elevation to Nearby Buildings/ Angle d'élévation des immeubles les plus proches:
   1. Greatest Angle/ Angle le plus grand 24 °
   2. Building Direction/ Direction de l'immeuble 45 °

5. Average Building Height in Area/ Hauteur moyenne des immeubles du voisinage: 14 m

6. Airflow Restrictions (Yes/No)/ Obstacles à la circulation de l'air: (oui/non)
   North/ Nord: YES
   South/ Sud: YES
   East/ Est: YES
   West/ Ouest: YES

7. Distance to Nearest Trees/ Distance jusqu'aux arbres les plus proches: NA m

8. Manifold/ Tuyauterie d'admission:
   1. Type:
   2. Distance from Supporting Structure/ Distance de la structure portante:

9. Meteorological Information/ Renseignements Météorologiques:
   1. Type: AVIATION
   2. Address/Adresse: EDMONTON INDUSTRIAL AIRPORT - 101 AIRPORT ROAD
   3. Distance from station/ Distance de la station: 3 km
   4. Contact/ Personne à contacter: A.E.S. CLIMATOLOGY BRANCH 452-1950

DOCUMENTATION ON NAPS NETWORK MONITORING STATIONS
DOCUMENTATION SUR LES STATIONS DU RÉSEAU SNPA

D. SITE INFLUENCES/EFFETS DE L'EMPLACEMENT

1. Localized Sources/Source Locales:
(within 200 m of monitor)/(à moins de 200 m du détecteur)

Type	Distance (m)	Description
FABRIC CARE	150	DRY CLEANERS
RAILWAY YARD CN	(2) 200-1000	CN RAILYARDS
PARKADE	75	UNDER CONSTRUCTION

2. Roadway Influences/Effets des routes:

Name/Nom	Type	Traffic Volume/ Intensité de la circulation	Distance (m)	Direction (degrees/degrés)
104 ST.	2 WAY	LIGHT	8	WEST
103 AVE.	1 WAY	LIGHT	5	NORTH
JASPER AVE.	2 WAY	14,300	300	SOUTH
105 ST.	2 WAY	14,050	200	WEST
104 AVE.	2 WAY	13,700	200	NORTH
101 ST.	2 WAY	28,100	400	EAST

3. Major Point Sources/Principales sources ponctuelles:

Map No./ N°. de la carte	Source Name/ Nom de la source	Source Type/ Type de source	Production Capacity/ Capacité de production	Distance from Site (km)/ Distance de l'emplacement (km)	Compass Direction (degrees)/ Direction (degrés)
2	GREYHOUND DEPOT	BUSES		.3	100
1	ROSSDALE POWER	POWER STACKS		1.5	180
3	CPR	RAILYARDS		.25-.40	270-360

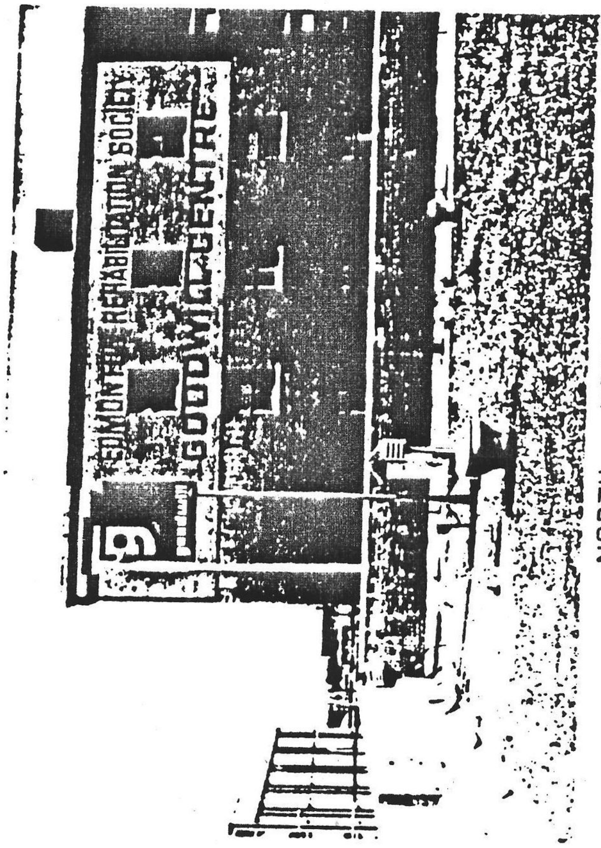
NAPS NO. SNPA 90130

DOCUMENTATION ON NAPS NETWORK MONITORING STATIONS
DOCUMENTATION SUR LES STATIONS RÉSEAU SNPA

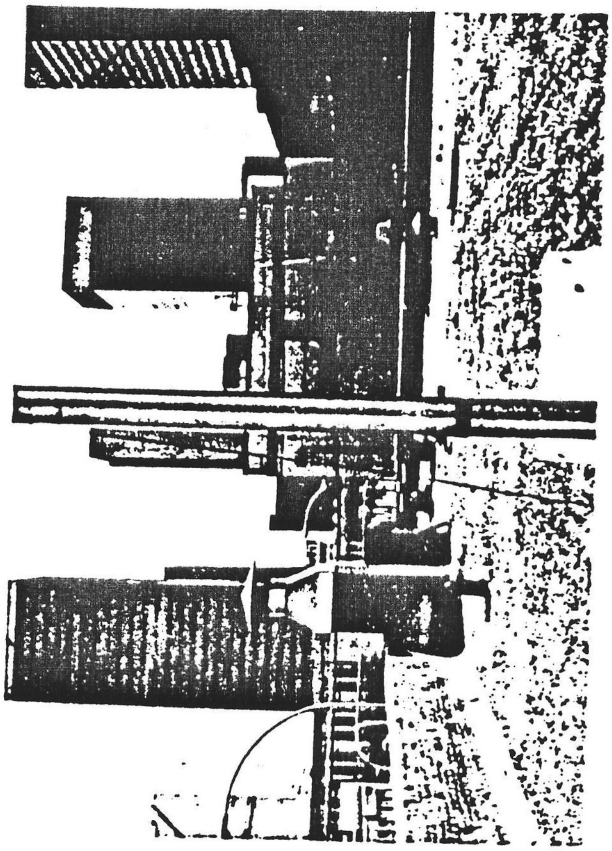
E. TOPOGRAPHIC MAP
E. CARTE TOPOGRAPHIQUE

DOCUMENTATION ON NAPS NETWORK MONITORING STATIONS
DOCUMENTATION SUR LES STATIONS DU RÉSEAU SNPA

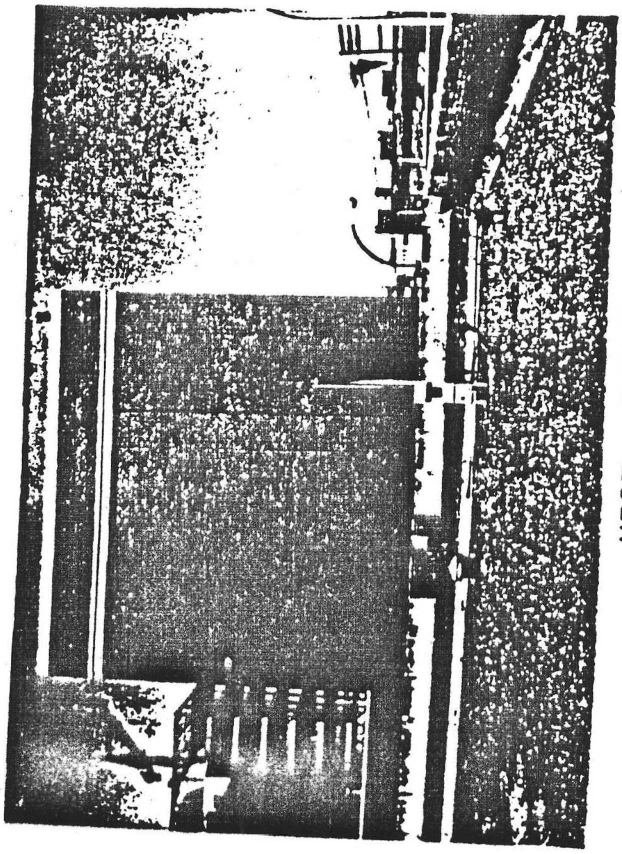
F. PHOTOGRAPHS (FROM INLET)
F. PHOTOGRAPHIES (PRISES DE L'ORIFICE D'ADMISSION)



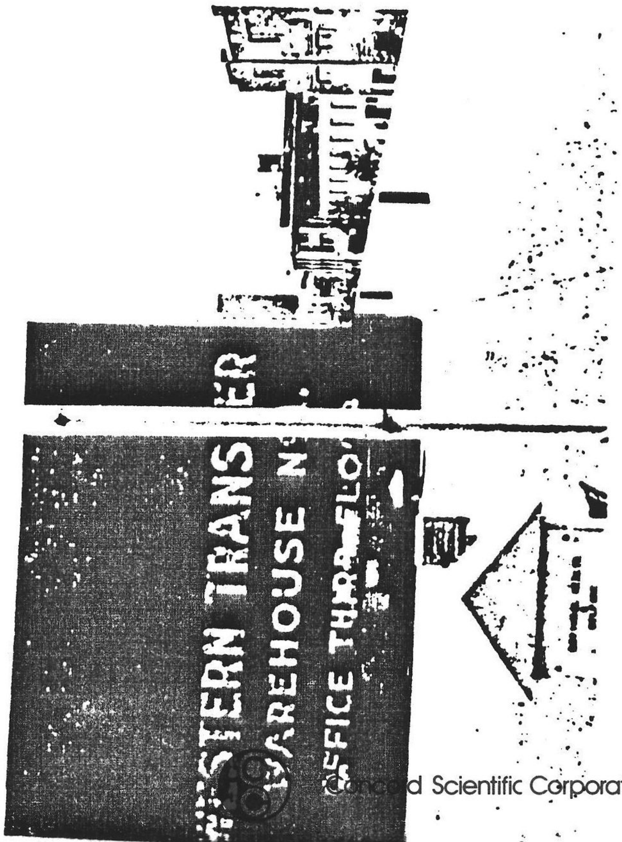
NORTH - NORD



EAST - EST



WEST - OUEST

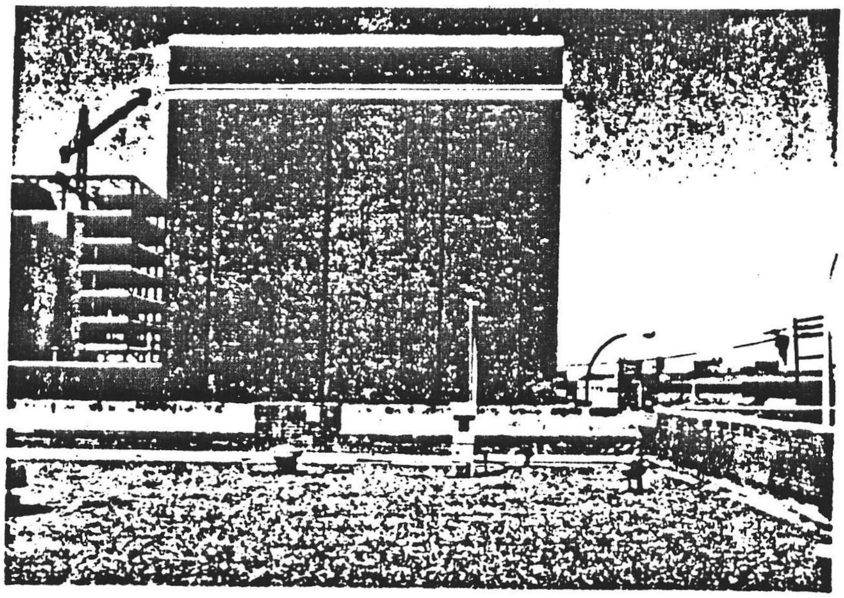


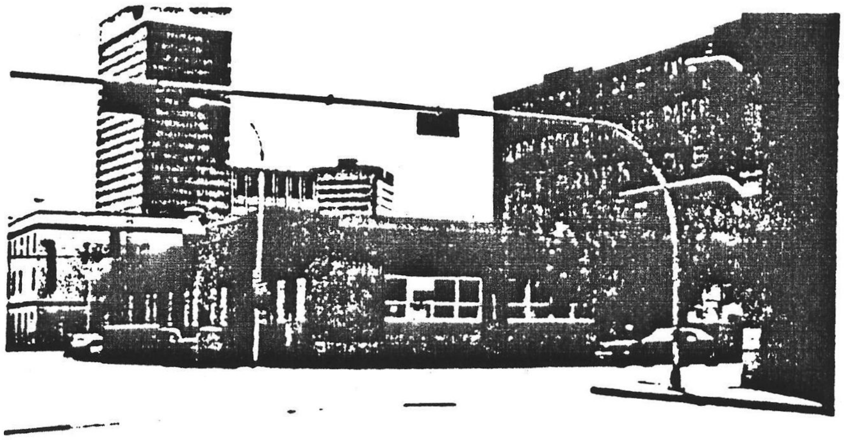
SOUTH - SUD

Concord Scientific Corporation

DOCUMENTATION ON NAPS NETWORK MONITORING STATIONS
DOCUMENTATION SUR LES STATIONS DU RÉSEAU SNPA

G. PHOTOGRAPHS (STATION)
G. PHOTOGRAPHIES (DE LA STATION)





DOCUMENTATION ON NAPS NETWORK MONITORING STATIONS

DOCUMENTATION SUR LES STATIONS DU RÉSEAU SNPA

A. GENERAL INFORMATION/INFORMATIONS GÉNÉRALES

1. Station Identification/ Identification de la station:

   00106 — NAPS Station No./ N°. SNPA

   T-2 — Agency Station No./ N°. de station de l'organisme exploitant

2. Station Name/ Nom de la station:

   G.V.R.D. OFFICES — Building Name, Park Name, etc./ Nom de l'immeuble, du parc, etc.

3. City/Ville:

   KITSILANO — Borough or Municipality Name/ Nom du quartier ou de la municipalité

   VANCOUVER, B.C. — City or Metropolitan Area Name/ Nom de la ville ou de la région métropolitaine

4. Station Address/ Adresse de la station:

   2294 WEST 10TH AVENUE — Street Number and Street Name/ N°. et nom de la rue

   VINE STREET — Nearest Cross-Street/ Intersection la plus proche

5. Latitude and Longitude/ Latitude et Longitude:

   49 15 45 — Latitude

   123 09 22 — Longitude

6. UTM Co-ordinates/ Coordonnées UTM:

   0488.625 — East/Est

   5456.45 — North/Nord

7. Population:

   Pop. of Borough or Municipality/ Pop. du quartier ou de la municipalité

   Census Year/ Année de recensement

   1,166,348 — Pop. of City or Metropolitan Area/ Pop. de la ville ou de la région métropolitaine

   1976 — Census Year/ Année de recensement

8. Operating Agency/ Organisme chargé de l'exploitation:

   GVRD — Agency Name/Nom

   NORM GUNN, AL PERCIVAL — Operator's Name/ Nom de l'exploitant

   731-1155 — Telephone/ Téléphone

9. Time Zone/ Fuseau horaire:

   PACIFIC HEURE DU PACIFIQUE — Time Zone/Fuseau horaire

10. Date:

   7207 — Date Station Established/ Date de la mise sur pied de la station

   78 12 — Date Information Last Updated/ Date de la dernière remise à jour des renseignements

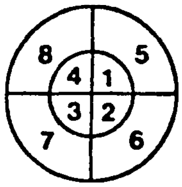
DOCUMENTATION ON NAPS NETWORK MONITORING STATIONS
DOCUMENTATION SUR LES STATIONS DU RÉSEAU SNPA

C. SITE DESCRIPTION/DESCRIPTION DE L'EMPLACEMENT

1. Scale of Representativeness/ Échelle de représentativité: NEIGHBOURHOOD VOISINAGE

2. Land Use by Sector (see map)/ Utilisation des terres par secteur: (voir la carte)

1	C1	5	C1, R2
2	I1	6	R2
3	R1	7	R2
4	I1	8	C1, R2



3. Site Elevation (above sea level)/ Altitude: 100 m

4. Angle of Elevation to Nearby Buildings/ Angle d'élévation des immeubles les plus proches:
   1. Greatest Angle/ Angle le plus grand: 90 °
   2. Building Direction/ Direction de l'immeuble: 180°

5. Average Building Height in Area/ Hauteur moyenne des immeubles du voisinage: 9 m

6. Airflow Restrictions (Yes/No)/ Obstacles à la circulation de l'air: (oui/non)

North/ Nord:	NO	South/ Sud:	YES
East/ Est:	NO	West/ Ouest:	NO

7. Distance to Nearest Trees/ Distance jusqu'aux arbres les plus proches: m

8. Manifold/ Tuyauterie d'admission:
   1. Type: PVC AND GLASS 15 CM DIA
   2. Distance from Supporting Structure/ Distance de la structure portante: 1 M

9. Meteorological Information/ Renseignements Météorologiques:
   1. Type: WIND SPEED DIRECTION ON ROOF
   2. Address/Adresse: OF GVRD BUILDING
   3. Distance from station/ Distance de la station: 0 km
   4. Contact/ Personne à contacter: (731-1155) AL PERCIVAL

DOCUMENTATION ON NAPS NETWORK MONITORING STATIONS
DOCUMENTATION SUR LES STATIONS DU RÉSEAU SNPA

D. SITE INFLUENCES/EFFETS DE L'EMPLACEMENT

1. Localized Sources/Source Locales:
(within 200 m of monitor)/(à moins de 200 m du détecteur)

Type	Distance (m)	Description
CARLINGS BREWERY	50	SMALL BREWERY

2. Roadway Influences/Effets des routes:

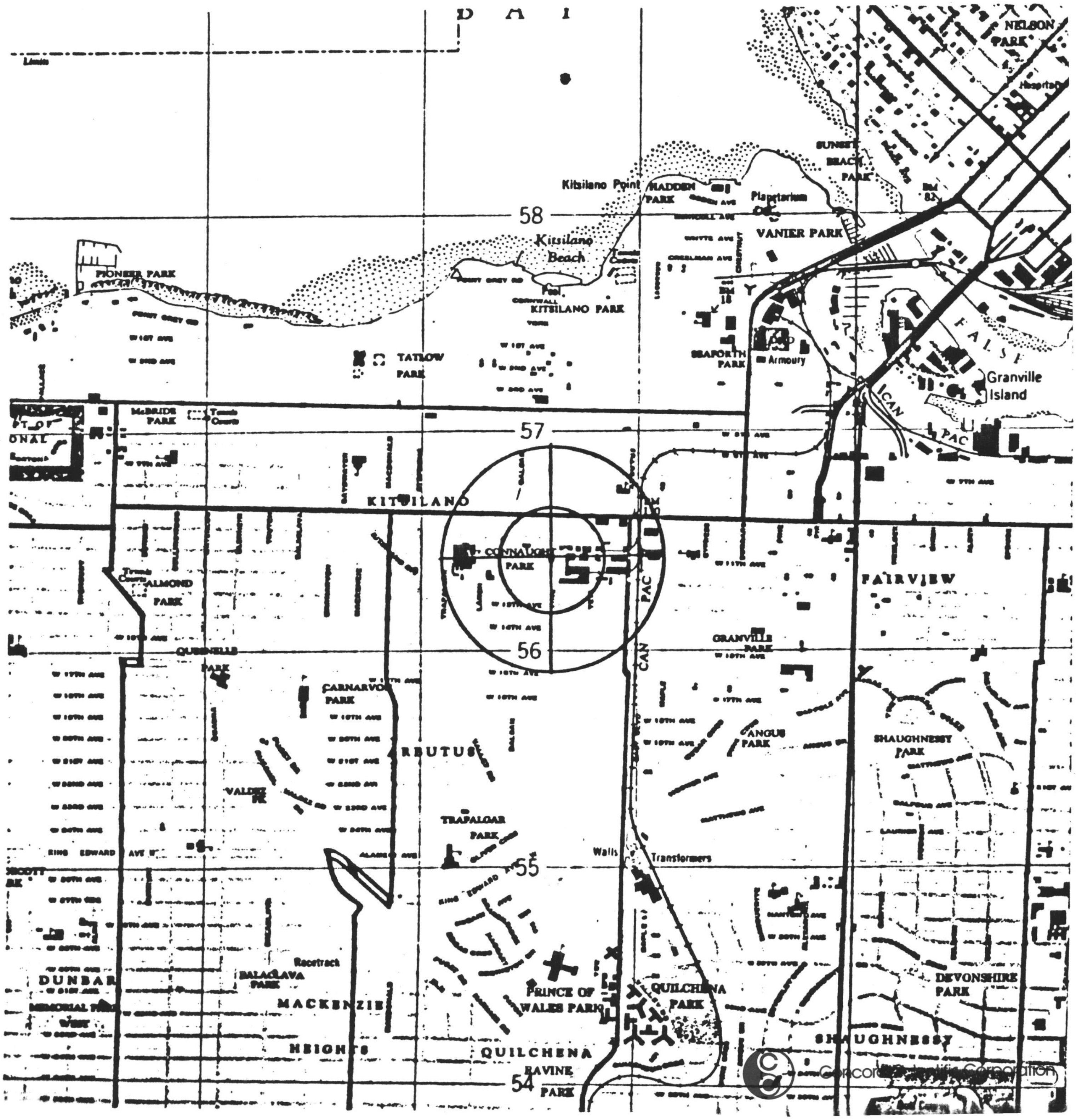
Name/Nom	Type	Traffic Volume/ Intensité de la circulation PER DAY	Distance (m)	Direction (degrees/degrés)
BROADWAY	MC	20,000, 29,000	100	0 (N)
ARBUTUS	MC	20,000, 29,000	200	90 (E)
12TH AVE.	MC	10,000-19,000	100	180 (S)
10TH AVE.	CS	<4,000	15	0 (N)

3. Major Point Sources/Principales sources ponctuelles:

Map No./ N°. de la carte	Source Name/ Nom de la source	Source Type/ Type de source	Production Capacity/ Capacité de production	Distance from Site (km)/ Distance de l'emplacement (km)	Compass Direction (degrees)/ Direction (degrés)

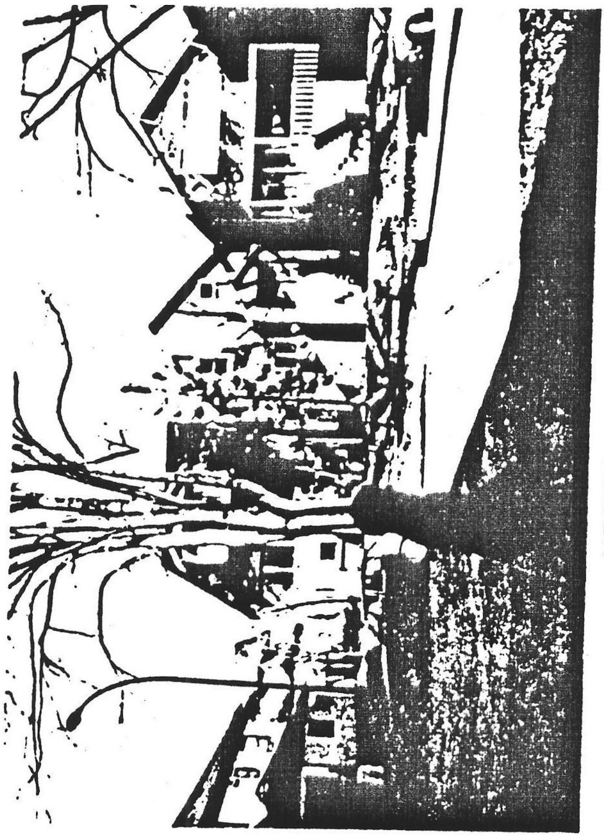
DOCUMENTATION ON NAPS NETWORK MONITORING STATIONS
DOCUMENTATION SUR LES STATIONS RÉSEAU SNPA

E. TOPOGRAPHIC MAP
E. CARTE TOPOGRAPHIQUE

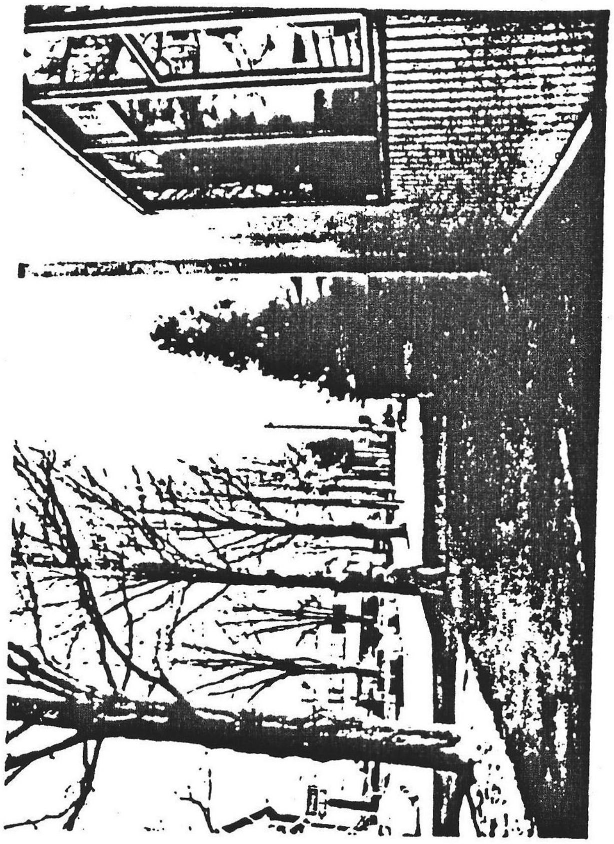


DOCUMENTATION ON NAPS NETWORK MONITORING STATIONS
DOCUMENTATION SUR LES STATIONS DU RÉSEAU SNPA

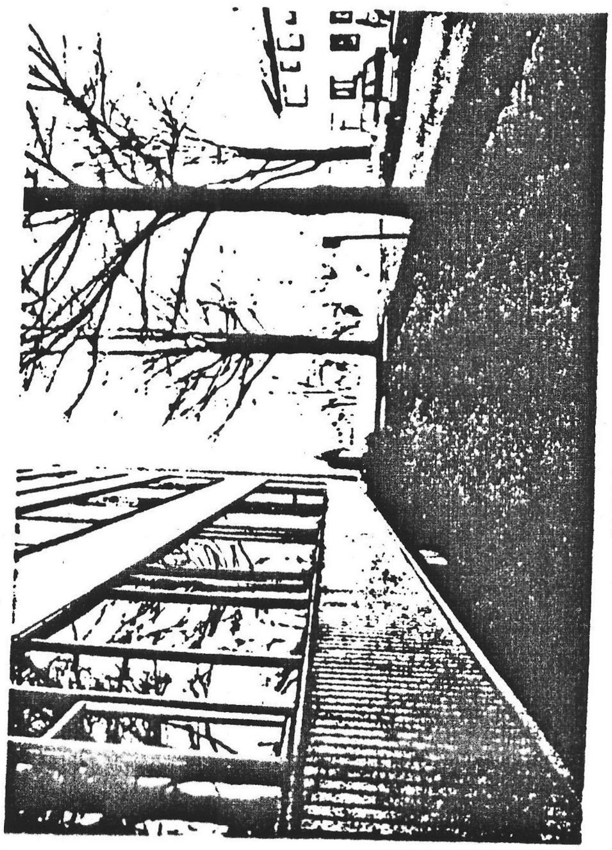
F. PHOTOGRAPHS (FROM INLET)
F. PHOTOGRAPHIES (PRISES DE L'ORIFICE D'ADMISSION)



NORTH - NORD



EAST - EST

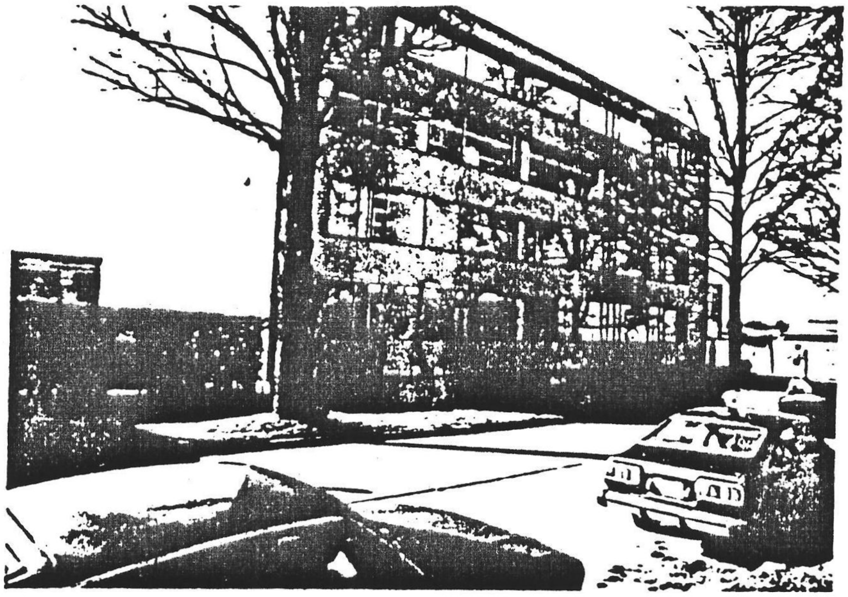


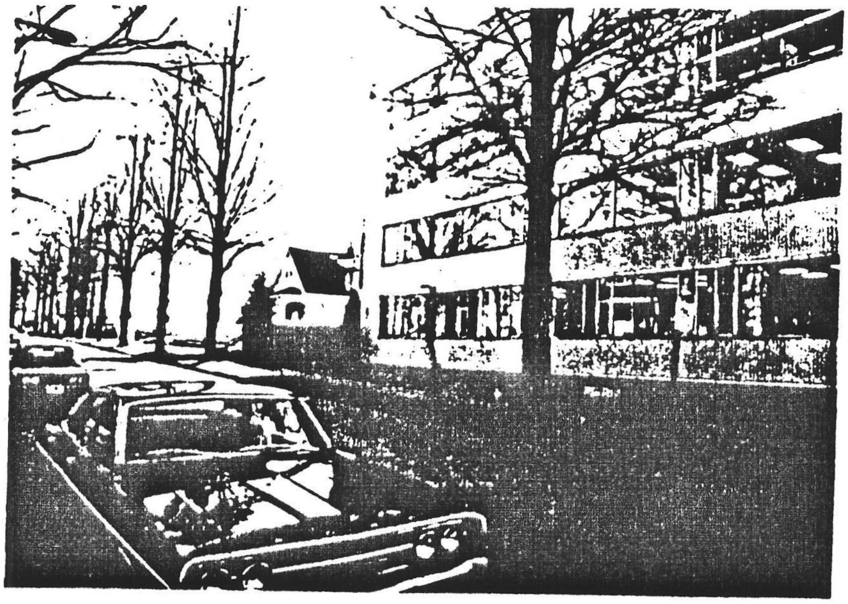
WEST - OUEST

NAPS NO. SNPA 00106

DOCUMENTATION ON NAPS NETWORK MONITORING STATIONS
DOCUMENTATION SUR LES STATIONS DU RÉSEAU SNPA

G. PHOTOGRAPHS (STATION)
G. PHOTOGRAPHIES (DE LA STATION)





APPENDIX VII

HIVOL TSP COMPARISON DATA

DICHOTOMOUS AIRBORNE PARTICULATE STUDY - SIMULTANEOUS HI-VOLUME SAMPLER RESULTS

MONTREAL: PEEL AND MAISONNEUVE

DATE		TSP ($\mu g/m^3$)	SO_4 ($\mu g/m^3$)	NO_3 ($\mu g/m^3$)	Pb ($\mu g/m^3$)	Cd ($\mu g/m^3$)	Cr ($\mu g/m^3$)	As ($\mu g/m^3$)
September	18	69	4.2	2.4	0.89	N/A	N/A	N/A
	24	83	5.9	3.7	0.78	N/A	N/A	N/A
	30	112	11.6	8.1	1.27	N/A	N/A	N/A
October	6	147	7.9	3.6	1.40	N/A	N/A	N/A
	12	53	4.5	1.9	0.67	N/A	N/A	N/A
	18	98	8.6	4.9	1.14	N/A	N/A	N/A
	24	118	5.2	1.5	1.49	N/A	N/A	N/A
	30	122	5.5	3.5	1.23	N/A	N/A	N/A
November	5	83	3.6	1.2	0.78	N/A	N/A	N/A
	11	43	4.7	0.9	0.57	N/A	N/A	N/A
	17	153	9.2	5.3	1.31	N/A	N/A	N/A
	23	117	10.6	5.5	1.25	N/A	N/A	N/A
	29	87	8.2	4.5	0.84	N/A	N/A	N/A
December	5	45	5.6	0.9	0.91	N/A	N/A	N/A
	11	43	5.8	0.9	0.78	N/A	N/A	N/A
	17	65	9.3	2.3	1.10	N/A	N/A	N/A
	23	120	22.0	7.5	1.09	N/A	N/A	N/A
	29	87	13.4	6.6	1.41	N/A	N/A	N/A
January	4	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	10	66	12.6	3.3	0.79	N/A	N/A	N/A
	16	99	21.0	6.2	0.97	N/A	N/A	N/A
	22	96	14.0	9.3	1.10	N/A	N/A	N/A
	28	187	6.5	2.5	0.59	N/A	N/A	N/A

DICHOTOMOUS AIRBORNE PARTICULATE STUDY - SIMULTANEOUS HI-VOLUME SAMPLER RESULTS

HALIFAX : N. S. TECHNICAL COLLEGE

DATE	TSP (µg/m^3)	SO_4 (µg/m^3)	NO_3 (µg/m^3)	Pb (µg/m^3)	Cd (µg/m^3)	Cr (µg/m^3)	As (µg/m^3)
September 18	29	13.8	1.1	0.17	N/A	N/A	N/A
24	55	12.6	0.7	0.25	N/A	N/A	N/A
30	37	13.5	1.5	0.11	N/A	N/A	N/A
October 6	25	11.6	0.3	0.09	N/A	N/A	N/A
12	N/A	N/A	N/A	N/A	N/A	N/A	N/A
18	39	16.0	3.7	0.07	N/A	N/A	N/A
24	N/A	N/A	N/A	N/A	N/A	N/A	N/A
30	N/A	N/A	N/A	N/A	N/A	N/A	N/A
November 5	N/A	N/A	N/A	N/A	N/A	N/A	N/A
11	N/A	N/A	N/A	N/A	N/A	N/A	N/A
17	N/A	N/A	N/A	N/A	N/A	N/A	N/A
23	N/A	N/A	N/A	N/A	N/A	N/A	N/A
29	N/A	N/A	N/A	N/A	N/A	N/A	N/A
December 5	N/A	N/A	N/A	N/A	N/A	N/A	N/A
11	36	14.3	1.7	0.18	N/A	N/A	N/A
17	37	17.2	1.6	0.35	N/A	N/A	N/A
23	34	15.6	1.6	0.23	N/A	N/A	N/A
29	N/A	N/A	N/A	N/A	N/A	N/A	N/A
January 4	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10	31	11.8	1.5	0.18	N/A	N/A	N/A
16	27	12.9	3.4	0.43	N/A	N/A	N/A
22	61	20.1	3.6	0.89	N/A	N/A	N/A
28	51	17.9	3.6	0.27	N/A	N/A	N/A

DICHOTOMOUS AIRBORNE PARTICULATE STUDY - SIMULTANEOUS HI-VOLUME SAMPLER RESULTS

OTTAWA ROOFTOP : 88 SLATER

DATE		TSP ($\mu g/m^3$)	SO_4 ($\mu g/m^3$)	NO_3 ($\mu g/m^3$)	Pb ($\mu g/m^3$)	Cd ($\mu g/m^3$)	Cr ($\mu g/m^3$)	As ($\mu g/m^3$)
September	18	36	8.6	1.4	0.41	N/A	N/A	N/A
	24	48	7.8	3.4	0.54	N/A	N/A	N/A
	30	57	12.6	9.1	0.59	N/A	N/A	N/A
October	6	40	8.8	1.8	0.50	N/A	N/A	N/A
	12	40	10.0	1.0	0.12	N/A	N/A	N/A
	18	41	10.4	3.5	0.22	N/A	N/A	N/A
	24	61	9.1	3.7	0.74	N/A	N/A	N/A
	30	47	5.6	1.7	0.43	N/A	N/A	N/A
November	5	71	7.6	0.4	0.19	N/A	N/A	N/A
	11	33	5.6	0.2	0.11	N/A	N/A	N/A
	17	100	10.0	5.2	1.42	N/A	N/A	N/A
	23	60	9.4	10.8	0.74	N/A	N/A	N/A
	29	33	9.2	4.3	0.23	N/A	N/A	N/A
December	5	33	8.6	1.2	0.39	N/A	N/A	N/A
	11	58	10.5	2.6	0.61	N/A	N/A	N/A
	17	39	7.	2.9	0.69	N/A	A	N/A
	23	146	23.6	14.4	1.41	N/A	N A	N/A
	29	54	14.4	7.6	0.60	N/A	N/A	N/A
January	4	45	16.7	0.9	0.11	N/A	N/A	N/A
	10	42	15.0	2.5	0.21	N/A	N/A	N/A
	16	56	13.5	5.4	0.52	N/A	N/A	N/A
	22	54	12.5	8.8	0.42	N/A	N/A	N/A
	28	81	9.3	2.7	0.41	N/A	N/A	N/A

DICHOTOMOUS AIRBORNE PARTICULATE STUDY - SIMULTANEOUS HI-VOLUME SAMPLER RESULTS

OTTAWA CURBSIDE: 88 SLATER

DATE	TSP ($\mu g/m^3$)	SO_4 ($\mu g/m^3$)	NO_3 ($\mu g/m^3$)	Pb ($\mu g/m^3$)	Cd ($\mu g/m^3$)	Cr ($\mu g/m^3$)	As ($\mu g/m^3$)
October 9	31	N/A	N/A	0.41	N/A	N/A	N/A
12	44	N/A	N/A	0.17	N/A	N/A	N/A
15	47	N/A	N/A	1.16	N/A	N/A	N/A
18	43	N/A	N/A	0.33	N/A	N/A	N/A
21	57	N/A	N/A	0.95	N/A	N/A	N/A
24	N/A	N/A	N/A	N/A	N/A	N/A	N/A
27	60	N/A	N/A	0.78	N/A	N/A	N/A
30	101	N/A	N/A	1.16	N/A	N/A	N/A
November 2	33	N/A	N/A	0.64	N/A	N/A	N/A
5	58	N/A	N/A	0.21	N/A	N/A	N/A
8	N/A	N/A	N/A	N/A	N/A	N/A	N/A
11	27	N/A	N/A	0.09	N/A	N/A	N/A
14	30	N/A	N/A	0.50	N/A	N/A	N/A
17	149	N/A	N/A	2.00	N/A	N/A	N/A
20	84	N/A	N/A	1.16	N/A	N/A	N/A
23	74	N/A	N/A	1.04	N/A	N/A	N/A
26	72	N/A	N/A	1.24	N/A	N/A	N/A
29	28	N/A	N/A	0.41	N/A	N/A	N/A
December 2	38	N/A	N/A	0.71	N/A	N/A	N/A

DICHOTOMOUS AIRBORNE PARTICULATE STUDY - SIMULTANEOUS HI-VOLUME SAMPLER RESULTS

TORONTO ROOFTOP : 67 COLLEGE

DATE		TSP (μg/m^3)	SO$_4$ (μg/m^3)	NO$_3$ (μg/m^3)	Pb (μg/m^3)	Cd (μg/m^3)	Cr (μg/m^3)	As (μg/m^3)
September	18	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	24	50	9.2	1.7	0.2	N/A	N/A	N/A
	30	119	22.4	12.8	1.0	N/A	N/A	N/A
October	6	53	12.9	3.6	0.4	N/A	N/A	N/A
	12	26	10.6	0.9	0	N/A	N/A	N/A
	18	42	12.6	2.9	0.3	N/A	N/A	N/A
	24	59	10.1	2.3	0.4	N/A	N/A	N/A
	30	67	12.7	5.2	0.3	N/A	N/A	N/A
November	5	103	11.7	0.7	0.2	N/A	N/A	N/A
	11	41	10.0	0.7	0.1	N/A	N/A	N/A
	17	58	12.3	2.6	0.6	N/A	N/A	N/A
	23	60	15.1	6.7	0.4	N/A	N/A	N/A
	29	40	14.1	3.1	0.3	N/A	N/A	N/A
December	5	82	7.7	1.9	0.6	N/A	N/A	N/A
	11	81	11.9	2.4	0.3	N/A	N/A	N/A
	17	82	1[illegible].8	3.9	0.5	[illegible]	N/A	N/A
	23	94	19.5	9.9	0.5	N/A	N/A	N/A
	29	4[illegible]	19.4	7.4	0.5	N/A	N/A	N/A
January	4	35	N/A	N/A	0.2	N/A	N/A	N/A
	10	40	N/A	N/A	0.3	N/A	N/A	N/A
	16	47	N/A	N/A	0.4	N/A	N/A	N/A
	22	43	N/A	N/A	0.4	N/A	N/A	N/A
	28	89	N/A	N/A	0.4	N/A	N/A	N/A

DICHOTOMOUS AIRBORNE PARTICULATE STUDY - SIMULTANEOUS HI-VOLUME SAMPLER RESULTS

TORONTO CURBSIDE : 67 COLLEGE

DATE		TSP ($\mu g/m^3$)	SO_4 ($\mu g/m^3$)	NO_3 ($\mu g/m^3$)	Pb ($\mu g/m^3$)	Cd ($\mu g/m^3$)	Cr ($\mu g/m^3$)	As ($\mu g/m^3$)
October	9	94	N/A	N/A	0.6	N/A	N/A	N/A
	12	65	N/A	N/A	0.4	N/A	N/A	N/A
	15	121	N/A	N/A	0.7	N/A	N/A	N/A
	18	98	N/A	N/A	0.6	N/A	N/A	N/A
	21	122	N/A	N/A	0.9	N/A	N/A	N/A
	24	189	N/A	N/A	1.1	N/A	N/A	N/A
	27	126	N/A	N/A	0.9	N/A	N/A	N/A
	30	168	N/A	N/A	1.0	N/A	N/A	N/A
November	2	91	N/A	N/A	0.6	N/A	N/A	N/A
	5	102	N/A	N/A	0.7	N/A	N/A	N/A
	8	106	N/A	N/A	0.8	N/A	N/A	N/A
	11	108	N/A	N/A	0.3	N/A	N/A	N/A
	14	112	N/A	N/A	0.7	N/A	N/A	N/A
	17	154	N/A	N/A	0.8	N/A	N/A	N/A
	20	225	N/A	N/A	1.1	N/A	N/A	N/A
	23	137	N/A	N/A	0.7	N/A	N/A	N/A
	26	207	N/A	N/A	1.1	N/A	N/A	N/A
	29	112	N/A	N/A	0.7	N/A	N/A	N/A
December	2	168	N/A	N/A	0.7	N/A	N/A	N/A

DICHOTOMOUS AIRBORNE PARTICULATE STUDY - SIMULTANEOUS HI-VOLUME SAMPLER RESULTS

WINNIPEG: 65 ELLEN STREET

DATE		TSP (μg/m³)	SO₄ (μg/m³)	NO₃ (μg/m³)	Pb (μg/m³)	Cd (μg/m³)	Cr (μg/m³)	As (μg/m³)
September	18	89	N/A	N/A	0.69	0.002	0.010	0.001
	24	34	N/A	N/A	0.36	0.002	< 0.010	0.001
	30	70	N/A	N/A	0.31	< 0.001	0.010	0.002
October	6	139	3.7	1.1	1.02	0.002	0.010	0.001
	12	33	1.2	0.3	0.30	< 0.002	< 0.010	0.001
	18	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	24	44	0.8	0.7	0.31	< 0.002	0.010	0.0
	30	153	2.1	0.2	0.40	< 0.002	0.010	0.004
November	5	78	2.1	0.4	0.77	0.002	0.010	0.003
	11	31	3.1	0.6	0.37	< 0.002	< 0.010	0.001
	17	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	23	43	1.2	0.1	0.22	0.002	0.010	0.001
	29	31	2.3	0.2	0.37	0.002	0.010	0.001
December	5	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	11	66	5.3	0.4	0.43	< 0.002	0.010	0.001
	17	15	6.7	0.3	0.25	0.002	0.020	0.004
	23	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	29	58	7.[illegible]	[illegible]	[illegible]	[illegible]	.03	0.002
January	4	38	3.8	0.6	0.16	.001	0.010	0.001
	10	56	6.9	2.7	0.66	.001	0.010	0.001
	16	53	3.3	1.0	0.39	.002	0.010	0.003
	22	33	2.1	2.2	0.92	.002	0.010	0.002
	28	8	2.1	0.4	0.33	< .002	0.010	0.0

DICHOTOMOUS AIRBORNE PARTICULATE STUDY - SIMULTANEOUS HI-VOLUME SAMPLER RESULTS

EDMONTON: 10255-104TH ST.

DATE		TSP (μg/m³)	SO_4 (μg/m³)	NO_3 (μg/m³)	Pb (μg/m³)	Cd (μg/m³)	Cr (μg/m³)	As (μg/m³)
September	18	97	N/A	N/A	N/A	N/A	N/A	N/A
	24	106	N/A	N/A	N/A	N/A	N/A	N/A
	30	107	N/A	N/A	N/A	N/A	N/A	N/A
October	6	233	N/A	N/A	N/A	N/A	N/A	N/A
	12	72	N/A	N/A	N/A	N/A	N/A	N/A
	18	153	N/A	N/A	N/A	N/A	N/A	N/A
	24	180	N/A	N/A	N/A	N/A	N/A	N/A
	30	145	N/A	N/A	N/A	N/A	N/A	N/A
November	5	233	N/A	N/A	N/A	N/A	N/A	N/A
	11	44	N/A	N/A	N/A	N/A	N/A	N/A
	17	146	N/A	N/A	N/A	N/A	N/A	N/A
	23	50	N/A	N/A	N/A	N/A	N/A	N/A
	29	101	N/A	N/A	N/A	N/A	N/A	N/A
December	5	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	11	36	N/A	N/A	N/A	N/A	N/A	N/A
	17	137	N/A	N/A	N/A	N/A	N/A	N/A
	23	50	N/A	N/A	N/A	N/A	N/A	N/A
	29	32	N/A	N/A	N/A	N/A	N/A	N/A
January	4	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	10	31	N/A	N/A	N/A	N/A	N/A	N/A
	16	42	N/A	N/A	N/A	N/A	N/A	N/A
	22	53	N/A	N/A	N/A	N/A	N/A	N/A
	28	N/A	N/A	N/A	N/A	N/A	N/A	N/A

DICHOTOMOUS AIRBORNE PARTICULATE STUDY - SIMULTANEOUS HI-VOLUME SAMPLER RESULTS

VANCOUVER: 2294 WEST 10TH ST.

DATE		TSP (μg/m³)	SO_4 (μg/m³)	NO_3 (μg/m³)	Pb (μg/m³)	Cd (μg/m³)	Cr (μg/m³)	As (μg/m³)
September	18	85	13.7	8.1	0.75	N/A	N/A	N/A
	24	102	18.3	4.1	1.37	N/A	N/A	N/A
	30	59	12.1	4.1	0.67	N/A	N/A	N/A
October	6	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	12	40	10.1	4.2	0.40	N/A	N/A	N/A
	18	73	11.0	3.1	1.42	N/A	N/A	N/A
	24	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	30	178	22.5	14.5	2.68	N/A	N/A	N/A
November	5	69	17.7	7.0	1.93	N/A	N/A	N/A
	11	59	12.9	3.2	1.06	N/A	N/A	N/A
	17	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	23	76	11.0	3.1	1.35	N/A	N/A	N/A
	29	N/A	N/A	N/A	N/A	N/A	N/A	N/A
December	5	45	8.5	2.8	0.36	N/A	N/A	N/A
	11	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	17	40	9.2	3.5	0.27	N/A	N/A	N/A
	23	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	29	28	6.3	1.2	0.73	N/A	N/A	N/A
January	4	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	10	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	16	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	22	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	28	N/A	N/A	N/A	N/A	N/A	N/A	N/A

AIR POLLUTION.

Study - Particulates