Assessment of Metal Concentrations in Atmospheric Particulates from Burnaby Lake B.C. (1995)

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R. Brewer, W. Belzer and Amy Poon
Environment Canada, Aquatic and Atmospheric Sciences Division, Suite 700-1200 W. 73rd Ave., Vancouver B.C., V6P 6H9

TABLE OF CONTENTS

ABSTRACT

Trace metals were assessed in atmospheric particulates at Burnaby Lake, in the greater Vancouver area of British Columbia to assess concentrations, particle size distributions and deposition rates to an urban watershed . Week-long samples were collected over a period of 18 weeks in 1995 using a 13 stage low pressure impactor (LPI) for particle size fractionation. Samples were analyzed using inductively coupled plasma atomic emission spectroscopy (ICP). Aluminum, boron, calcium, iron, magnesium, sodium and strontium had a similar time series pattern and particle size distribution. For these metals, maximum concentrations occurred during weeks of low precipitation and exhibited a large peak in mid June. The particle size distribution was trimodal with peaks at <0.08, 1.4-3.3 and 10.5-15.5 μm. Metal concentrations were generally one to three orders of magnitude higher than those measured in rural Abbotsford, B.C. but similar to those measured in urban Taipei, Taiwan. Deposition velocities were calculated for each size fraction using a simple turbulence relationship for particles <5 μm and a particle size dependent turbulence relationship taking in account inertial forces for particles >5 μm. Values ranged between 0.22 and 13 cm/s with the highest values corresponding to particle size fractions >10 μm. Deposition rates varied for each metal with mean values ranging between 0.35 $\mu g/m^2$/day to 490 mg/m^2/day. Depending on the metal, yearly loadings to the watershed ranged from <10 kg to several thousand tonnes. Calcium, aluminum, boron and magnesium had the highest metal loadings to the watershed. Manganese and zinc also had relatively high loadings, a reflection of the high traffic density in the area. The relatively high metal deposition rates indicate that metal contribution from atmospheric sources may represent a significant portion of the total metal load to the Brunette River watershed.

RÉSUMÉ

On a étudié les métaux-traces de particules atmosphériques prélevées au lac Burnaby, dans la région du Grand Vancouver (Colombie-Britannique), pour déterminer les concentrations de métaux, la granulométrie des particules et les taux de dépôt dans un bassin hydrographique de région urbaine. Pendant une période de 18 semaines en 1995, on a fait des prélèvements d'une durée d'une semaine chacun au moyen d'un impacteur basse pression à treize étages pour séparer les particules selon leur taille. Les échantillons ainsi recueillis ont été analysés par spectroscopie d'émission avec plasma induit par haute fréquence. L'aluminium, le bore, le calcium, le fer, le magnésium, le sodium et le strontium avaient la même série chronologique et la même distribution granulométrique. Les concentrations de ces métaux étaient maximales les semaines de faible pluviosité, et ont donné un grand pic à la mi-juin. La distribution granulométrique des particules comprenait trois pics : à < 0,08, à 1,4 - 3,3 et à 10,5 – 15,5 μm. Les concentrations de métaux étaient généralement supérieures par un à trois ordres de grandeur à celles mesurées à Abbotsford, localité rurale de la Colombie-Britannique, mais elles étaient semblables à ce qu'on mesure en milieu urbain à Taipeh, en Taiwan. On a calculé la vitesse de dépôt de chacune des fractions granulométriques; pour les particules < 5 μm, on s'est servi d'une fonction de turbulence simple et, pour les particules > 5 μm, on a utilisé une fonction de turbulence liée à la granulométrie et prenant en compte les forces d'inertie. Les valeurs obtenues étaient comprises entre 0,22 et 13 cm/s; les plus élevées correspondaient aux fractions granulométriques > 10 μm. Les taux de dépôt variaient selon le métal, avec des moyennes allant de 0,35 $\mu g/m^2$/jour à 490 mg/m^2/jour. Selon le métal considéré, les charges annuelles dans le bassin hydrographique allaient de < 10 kg à plusieurs milliers de tonnes. Les charges les plus élevées ont été mesurées pour calcium, l'aluminium, le bore et le magnésium. Les charges de manganèse et de zinc étaient aussi relativement élevées, ce qui s'expliquer par l'intense trafic automobile dans la région. Le taux de dépôt des métaux a atteint des valeurs relativement élevées, ce qui signifie que les sources atmosphériques contribuent pour une part importante à la charge totale de métaux dans le bassin de la rivière Brunette.

1. INTRODUCTION

Atmospheric particles include all airborne solid and liquid substances. Particles are classified as primary (emitted directly into the atmosphere) or secondary (formed in the atmosphere through chemical and physical transformations). Nucleation mode particles (< 0.1 μm in diameter) are formed primarily from the condensation of hot vapours during high temperature combustion processes and from the nucleation of atmospheric gas species to form new particles. Particles in the accumulation mode (0.1-2.0 μm) result from the coagulation of particles in the nucleation mode and from the condensation of vapours onto existing particles. Particles larger than 2.0 μm (sedimentation or coarse mode) are typically associated with mechanical processes such as wind erosion, marine aerosols and grinding operations that generate windblown soil, sea salt spray and dust.

Atmospheric particles are of concern due to their impacts on visibility, human health, plants, aquatic life and materials. Visibility impairment is caused by the scattering and absorption of light by atmospheric aerosols, particularly those of <2.5 μm (National Research Council, 1993). Human impacts are largely health-related and generally associated with inhalation of particulate matter of <10 μm in diameter. Both acute and chronic effects have been linked to exposure of inhalable particles with a demonstrated decrease in lung function, increased respiratory disease symptoms and increased mortality (CEPA/FPAC, 1998). Respirable particles (<2.5 μm in diameter) can reach the lung alveoli and hence are especially important in the absorption of metals and other toxic contaminants. Detrimental effects on vegetation include reduced growth and productivity due to interference with photosynthesis and phytotoxic impacts. Aquatic life can be affected through ingestion and adsorption of particulate matter deposited or washed into water bodies. Buildings and materials are negatively affected through increased rates of corrosion, erosion, soiling and discoloration.

The present study was conducted under the Fraser River Action Plan as part of a larger ecosystem study designed to assess the atmospheric contribution of contaminants of concern to the Still Creek-Burnaby Lake-Brunette River ecosystem. In this study metals were measured in atmospheric aerosols at Burnaby Lake, located in a highly urbanized and industrialized area within the municipalities of Burnaby, Vancouver and New Westminster, B.C. (Figure 1). Anthropogenic sources of trace metals to the watershed are typically dominated by vehicular and industrial emissions.

The objectives of this study were 1) to characterize the concentration and particle size distribution of metals in ambient air in the Burnaby Lake area; 2) to quantify atmospheric deposition of metals to the watershed; 3) to examine the

seasonal variation in metal concentrations and deposition rates and their relationships to environmental factors.

2. SITE DESCRIPTION

Burnaby Lake is located between two ridges that run laterally for several kilometers in an approximately east-west direction on the north and south sides of the lake. Because of the topography, the natural flow of winds though the lake basin is generally from the east or the west. The watershed drains 6,060 hectares of land divided into four predominant land uses: 42% residential, 31% open space and forested, 15% commercial and institutional and 5.5% industrial (Hall and Anderson, 1988). Approximately 15% of the total land area is taken up by highways, streets and alleys. This includes two major highways (Highways 1 and 7) which follow the lower elevation contours around both sides of Burnaby Lake and form the major east-west corridor between Vancouver and the Fraser Valley. The commercial and institutional areas uses are scattered throughout the basin, while the industrial areas (mechanical, shipping, transportation and manufacturing) are concentrated along Still Creek to the west of Burnaby Lake (Hall and Anderson, 1988). The north, south and south west sides are surrounded by residential areas. Highway 7 runs along the north side of the lake and Highway 1 along the south side. A major intersection connects these two highways to the east (Figure 1).

Atmospheric sampling equipment was installed on the roof of the Rowing Club Pavilion Building on the south side of Burnaby Lake at a height of 4.9 m above water. The building was situated over the lake on pilings and was away from any local sources of pollution. The site was chosen for its proximity to traffic corridors, as well as its distance from any particular point source. Because the site was free of any physical obstructions to wind flow, samples were expected to be representative of the area.

3. METHODS

3.1 Field Sampling Procedure

3.1.1 Instruments

3.1.1.1 Meteorological

A meteorological tower was used for recording physical variables such as wind direction, wind speed, temperature, barometric pressure and relative humidity.

Wind speed and direction were measured using an RM Young anemometer mounted at a height of 7.9 m above the lake and 3 meters above sampling height. Temperature was measured using an RM Young thermistor. Barometric pressure was measured with a Setra Systems aneroid barometer. Relative humidity was measured with an RM Young hygrometer. Rainfall amount was measured using an Environment Canada standard rain gauge. Meteorological data were captured by a CR-10 data logger from Campbell Scientific.

3.1.1.2 Low Pressure Impactor

Atmospheric particulate matter was collected with a 13 stage low pressure cascade impactor (LPI) Model # 20-930 capable of separating atmospheric particles into 13 unique size fractions corresponding to the following cutoff diameters (μm): >35, 21.7, 15.7, 10.5, 6.6, 3.3, 2.0, 1.4, 0.9, 0.52, 0.23, 0.11 and 0.08. Sampling procedures were those established by the manufacturer (Graseby Andersen, Smyrna, Georgia). Glass fiber filters were used as substrates for the impaction plates and backup filter. Substrates were sprayed according to manufacturer's specifications with silicone spray (Dow Corning 316) to diminish particle bounce and improve capture. Samples were collected for 18 weeks between April 11 and October 17, 1995 (Table 1). Individual samples were collected over a period of seven days with the exception of the August 29 sample which was collected over 14 days. The sampling volume ranged from 29.8-60.7 m^3. The flow rate (3.0 L/min) was calculated from the pressure drop across the critical orifice using a calibration graph provided by the manufacturer. In order to sample continuously thorough various weather conditions, the LPI was positioned beside a rainfall sampler equipped with an automatic cover. During periods of precipitation, the rain sampler cover automatically slid over the LPI thereby protecting it from rain.

3.1.2 Field Quality Assurance/Quality Control

3.1.2.1 Meteorological Data

To ensure that the meteorological instruments were performing to standard, they were evaluated yearly using manufacturer's procedures to ensure that they performed accurately and within the manufacturer's specifications. The standard Environment Canada rain gauge had an accuracy of ±0.1 mm. The accuracy of the wind speed was ±0.05 m/s over the threshold limit of 0.5 m/s over a range of 0-30 m/s, and the accuracy was within 5 degrees of true north after initial site setup with a magnetic compass. The accuracy of the RM Young thermistors was ±0.4°C. The RM Young hygrometers were accurate to ±3% over a range of 0-100%. The RM Young barometers were accurate to ±0.2 mb over a range of 800-1,100 mb.

3.1.2.2 Blanks and Sample Handling

A field blank was used to assess sample handling. Sample handling quality assurance protocols were established and documented prior to starting the sampling program to ensure consistent procedures and reduce variability in the data. Personnel were required to wear polyethylene gloves during sample handling.

3.2 Laboratory Methods

Samples were analyzed at ZENON Analytical Services, Vancouver, B.C., using Inductively Coupled Plasma Atomic Emission Spectroscopy (ICP) (BCMELP, 1983).

The QA/QC component of the analytical analysis consisted of substrate and reagent blanks. Blanks were used to assess reagents, methods, standards, instruments and calibrations.

3.3 Data Processing and Analysis

Concentrations

Raw data were blank corrected based on averaged field blank values. Values below the minimum detection limit were set to zero, for reporting purposes. Concentrations were calculated from blank corrected data by dividing sample weights by the sample volume as reported in Table 1.

Deposition Velocities

Deposition velocities (V_d) for particles <5 μm were calculated after Slinn and Slinn (1980), while those for particles >5 μm were calculated after Noll and Fang (1989). For particles <5 μm, the deposition velocity was calculated using the following formula:

$$V_{d(<5\mu m)} = C_D\, u_{avg(h)} \qquad (m/s)$$

where:
C_D= the drag coefficient (1.3×10^{-3})
$u_{avg(h)}$ = the mean wind velocity at height h (m/s)

Deposition velocities for particles >5 μm were calculated assuming negligible gravitational effects using the following formula:

$$V_{d(>5\mu m)} = E_A u^*_{avg} \qquad (m/s)$$

where:
E_A= the particle effective inertial coefficient = $1.12e^{-30.36/da}$
where: d_a is the aerodynamic particle diameter
u^*_{avg} = the mean friction velocity = $k\ u_{avg}\ \ln [Zo/(Z-d)]$ (m/s)
where: k = Von Karman's constant (0.4)
Zo = surface roughness (0.25 m)
Z = height of the wind speed measurement (m)
d = height of the sampler above ground (m)

Deposition Rates

Deposition rates were calculated from the product of the deposition velocity and metal concentration in each particle size fraction. Total deposition (D_t) was calculated as the sum of deposition rates for each particle size interval. The equation consisted of a combination of the Slinn and Slinn (1980) and Noll and Fang (1989) equations, for particles of diameter <5 μm and >5 μm, respectively:

$$D_t = \Sigma_{(da<5\mu m)} [(1.3x10^{-3})\ u_{avg} Cd_a] + \Sigma_{(da>5\mu m)}[(1.12e^{-30.36/da}\ u^*_{avg})Cd_a] \quad (ng/m^2/s)$$

where:
d_a = the aerodynamic particle diameter
Cd_a = the contaminant concentration for particles of diameter "a" (ng/m^3)
u_{avg} = mean wind speed (m/s)
u^*_{avg} = mean friction velocity (m/s)

Principal Components Analysis

Principal Component Analysis (PCA) was used for source interpretation. PCA simplifies the data set into a smaller number of representative components which reflect the attributes of the data. Source types are identified by associating the statistically significant component loadings with elements related to specific source types. Data were arranged in a matrix such that each column contained either the concentration of one chemical species or a physical parameter and each row a single weekly sample. Prior to running the analysis, data were log transformed and standardized (to standard deviation). Metals with >5 non-detectable values were not included in the PCA analysis. Principal components were extracted using a correlation matrix.

4. RESULTS AND DISCUSSION

4.1 Meteorological Data

Meteorological data collected during the study period are presented in Table 2. Results represent average weekly values. Some meteorological data was lost or suspect for several reasons: data logger overload, violent storms that flooded equipment or knocked it over and freezing conditions. The mean temperature ranged from a low of 7.9°C to a high of 19.8°C. The mean relative humidity ranged from 73.1-92.5% with lower values typical of the summer months. Precipitation varied throughout the study period, ranging from 0-89.8 mm with considerably greater amounts of precipitation falling during fall months. Mean atmospheric pressure values ranged from 1,009-1,018 mb. Wind speeds ranged from 1.3-1.9 m/s. Winds were predominantly from the east during the study period. Because the wind direction was evaluated from frequency patterns, there was often difficulty in determining a "prevailing" wind direction, especially when daily wind direction predominated in two or more different octants in the same week.

4.2 QA/QC Evaluation of Data

Table 3 presents metal concentrations measured in individual substrate blanks and mean values for all substrates. Mean blank values were used for correction of the raw data. Due to the presence of metals in the blanks and frequent non-detectable values, the blank corrected data were compared against laboratory method detection limits for each metal (not shown). This assessment indicated that the data fell into three categories (Table 4). Group 1 metals had stage specific mean concentrations generally below the method detection limit, but the sum total of the fractions was above this limit. Data for these group of metals could not be evaluated for particle size distribution, so evaluation was restricted to the sum of particle fractions. Group 2 metals had stage specific concentrations that were generally above the detection limit, allowing for evaluation of particle size distributions. Group 3 metals were not detected in any samples. Silicon was omitted from interpretation, because silicon spray was sprayed on all substrates to improve particle capture.

4.3 Metal Data

For the following discussion, refer to Figure 2 for time series of metal concentrations and precipitation volumes over the sampling period; Figure 3 for size fractionated mean metal concentrations for all samples; Figure 4 for size fractionated mean metal concentrations by season; Figure 5 for time series of metal deposition rates; Figure 6 for size fractionated mean deposition rates; and Figure 7 for the PCA loadings plot of weekly metal concentrations for the sum of particle fractions. Refer to: Table 5 for the statistical summary of trace metal concentrations for all samples; Table 6 for the statistical summary of metal deposition rates for all samples; Table 7 for the estimates of yearly deposition rates; and Table 8 for the component loadings for the PCA analysis. Refer to

Appendix A for the raw data tables for size fractionated metal concentrations and Appendix B for size fractionated deposition rates.

4.3.1 Silver (Ag)

Silver was detected in concentrations ranging from ND-0.015 μg/m^3 with a mean of 0.0014 μg/m^3. Silver concentrations exhibited a large peak the week of April 11 followed by a smaller peak the week of May 16 (Figure 2). Concentrations were near detection limits for the remainder of the sampling period. The particle size distribution pattern could not be determined, due to levels being below the detection limit for many samples. Deposition rates ranged from ND-39 μg/m^2/day (Figure 5). The estimated deposition rate to the entire Brunette River watershed (6,060 ha) was approximately 128 kg/year (Table 7). Local sources of silver include photo-finishing shops, automobile emissions (Kitto, 1993), incineration and marine aerosols (Chow and Watson, 1998).

4.3.2 Aluminum (Al)

Aluminum was detected in concentrations ranging from 13-760 μg/m^3 with a mean of 200 μg/m^3. Maximum concentrations occurred the week of June 13 followed by multiple smaller peaks between August 22 and September 26 (Figure 2). During the week of June 13 there was a corresponding Al peak in rainfall measured in a parallel study at Burnaby Lake (Belzer *et al*., 1997). Generally, however, the Al peaks corresponded to periods of low precipitation, indicating that particle-associated aluminum was being washed out by rainfall events. Mean concentrations were over two orders of magnitude higher than those measured in a rural location at Abbotsford in 1996 (Belzer *et al.,* 1998) and approximately 40 times higher than those measured in urban Taipei (Li *et al.,* 1993). The particle size distribution was trimodal with peaks in the <0.08, 1.4-3.3 and 10.5-15.5 μm size ranges (Figure 3). Aerosols from metal smelters and possibly an aluminum fabrication plant south of the Canada/U.S. border are possible sources of the ultrafine fraction (<0.1 μm), while soil dusts are likely sources of the particles in the sedimentation mode (1.4-15.7 μm). Some seasonal variation was observed in the particle size distribution with a large peak in the 10.5 μm size range during the fall season (Figure 4). Deposition rates ranged between 8.0-930 mg/m^2/day with a maximum on the week of June 13 (Figure 5). Due to greater depositional velocities for larger particles, deposition rates were highest for particles ≥10.5 μm (Figure 6). The estimated deposition rate to the entire Brunette River watershed was approximately 4,500 tonnes/year (Table 7). A significant portion of this load is expected to enter local rivers within the watershed, which is a concern as local water measurements have shown exceedences of federal and provincial water quality guidelines for aluminum (Sekela *et al.,* 1998). PCA analysis indicated that aluminum was associated with crustal and oceanic elements such as barium, calcium, iron, magnesium and strontium (Figure 7).

4.3.3 Arsenic (As)

Arsenic was detected in concentrations ranging from ND-0.28 μg/m^3 (Figure 2) with a mean of 0.023 μg/m^3. Arsenic exhibited a single large peak the week of April 11 when the concentration (0.28 μg/m^3) approached the Ontario Ministry of Environment ambient air quality guideline of 0.3 μg/m^3 (OME, 1999). This value is similar to that obtained over Lake Huron (Strachan and Eisenreich, 1988). The remainder of the samples were near the detection limit (0.0013 μg/m^3). The particle size distribution pattern could not be determined due to frequent concentrations below the detection limit. The deposition rate mirrored the concentration pattern, ranging between ND-950 μg/m^2/day (Figure 5). The estimated deposition rate to the entire Brunette River watershed was approximately 2 tonnes/year (Table 7). Local metal finishing shops are possible sources of arsenic in the area.

4.3.4 Boron (B)

Boron was detected in concentrations ranging from 3.3-180 μg/m^3 with a mean of 55 μg/m^3. The highest concentrations corresponded to periods of low precipitation (Figure 2). Boron exceeded the Ontario Ministry of Environment 24 hour ambient air quality standard of 120 μg/m^3 (OME, 1999) in two of the 16 samples. The seasonal pattern and particle size distribution (Figure 3) closely mirrored that of aluminum, calcium and magnesium, suggesting similar sources. Deposition rates ranged between 2,200-220,000 μg/m^2/day with peak rates corresponding to concentration maxima (Figure 5). Deposition rates were highest for the 10.5 and 15.7 μm size fractions (Figure 6). The estimated deposition rate to the entire Brunette River watershed was approximately 1,200 tonnes/year (Table 7). PCA analysis indicated that boron was associated with crustal and oceanic elements (Figure 7), however local metal industries and use of fertilizers are also possible sources (Merck Index 1989).

4.3.5 Barium (Ba)

Barium concentrations ranged between 0.0052-1.1 μg/m^3 with a mean of 0.24 μg/m^3. Maximum concentrations occurred during the weeks of June 13 and August 22 (Figure 2). Parallel peaks were detected in rainfall during the same weeks (Belzer *et al*., 1997). Mean concentrations were nearly four times higher than those measured at Abbotsford (Belzer *et al.,* 1998). The particle size distribution was trimodal with peaks in the <0.08 and 1.4-3.3 and 10.5-15.7 μm size ranges (Figure 3). Deposition rates ranged between 0.86-1,100 μg/m^2/day and closely followed the concentration pattern (Figure 5). Deposition of barium was largely in the coarse particle size range, ≥10.5 μm (Figure 6). The estimated deposition rate to the entire watershed was approximately 4.6 tonnes/year (Table 7). Barium was associated with crustal and oceanic elements in the PCA analysis (Figure 7).

4.3.6 Beryllium (Be)

Beryllium concentrations ranged between ND-0.022 μg/m^3 with a mean of 0.0024 μg/m^3. The maximum concentration occurred during the week of June 13 (Figure 2). Particle size distribution could not be determined due to frequent samples below the detection limit. Deposition rates ranged between ND-27 μg/m^2/day and mirrored concentration patterns (Figure 5). The estimated deposition rate to the entire Brunette River watershed was approximately 67 kg/year (Table 7). Manufacturing of metals and electrical equipment may represent local sources of beryllium (Merck Index, 1989). Beryllium was associated most closely with lead in the PCA analysis (Figure 7), suggesting common sources.

4.3.7 Calcium (Ca)

Calcium levels ranged between 41-1,800 μg/m^3 with a mean of 480 μg/m^3. The highest concentrations corresponded to periods of low precipitation (Figure 2). Mean concentrations were approximately 600 times higher than those measured in rural Abbotsford (Belzer *et al.,* 1998) and approximately two orders of magnitude higher than those measured in urban Taipei (Li *et al.,* 1993). The seasonal pattern was similar to that of aluminum, boron and magnesium, with a large concentration peak the week of June 13 followed by smaller peaks for the weeks of August 22 and Sept 12. For the latter two weeks, Ca peaks were also noted in precipitation samples (Belzer *et al*., 1997). The particle size distribution was trimodal in the summer and fall with peaks in the <0.08 and 1.4-3.3 and 10.5-15.7 μm size ranges (Figure 4). The spring particle size distribution showed a large peak at 10.5 μm. Deposition rates ranged from 17 mg/m^2/day to 2.3 g/m^2/day and closely followed concentration maxima (Figure 5). Deposition rates were highest in the 10.5 and 15.7 μm size ranges (Figure 6). The estimated deposition rate to the entire watershed was approximately 11,000 tonnes/year (Table 7). PCA analysis indicated that calcium was associated with crustal and oceanic elements (Figure 7), suggesting natural sources, such as soil dusts and sea salts. Local cement plants (Chow and Watson, 1998) may also be contributing to the overall calcium load to the area.

4.3.8 Cadmium (Cd)

Cadmium was detected only during the weeks of October 3 and October 10, at 0.0018 and 0.0045 μg/m^3, respectively (Figure 2). These levels were within the range measured over the Canadian Great Lakes (Strachan and Eisenreich, 1988) but 2-4 times higher than those reported for uninhabited parts of the world (OECD, 1994). The particle size distribution could not be determined due to the limited number of samples measured above the detection limit. The deposition rate for the week Oct 3 was 12 μg/m^2/day. The estimated deposition rate to the entire Brunette River watershed was approximately 24 kg/year (Table 7). Cadmium exceeded federal and provincial water quality guidelines in both Still Creek and Brunette River located upstream and downstream of Burnaby Lake,

respectively (Sekela *et al.,* 1998), indicating that the influence of the air pathway may be significant. Anthropogenic sources normally make up the majority of cadmium in atmospheric aerosols. In Canada, the largest cadmium source is the extraction and refining of metals from non ferrous sources, while transportation and sewage sludge incineration represent lesser sources (Environment Canada, 1998). Rocks and soils contain trace amounts of cadmium (Merck Index, 1989).

4.3.9 Cobalt (Co)

Cobalt was detected in concentrations ranging from ND-0.030 $\mu g/m^3$ with a mean of 0.0050 $\mu g/m^3$. The highest levels occurred during the spring months (Figure 2). Mean concentrations were over an order of magnitude higher than those measured at Point Petre on Lake Ontario (Hoff and Brice, 1994) but similar to concentrations measured in urban Taipei (Li *et al.,* 1993). The particle size distribution could not be determined due to the limited number of samples measured above the detection limit. The deposition rate ranged from ND-55 $\mu g/m^2$/day (Figure 5). The estimated deposition rate to the entire watershed was approximately 130 kg/year (Table 7). Water quality measurements indicate that cobalt exceeded the provincial water quality guideline in Steel Creek (Sekela *et al.,* 1998) which may be largely due to atmospheric inputs. Local sources of cobalt include the manufacture of metal alloys (Merck Index, 1989) and vehicular emissions (Ward, 1990).

4.3.10 Chromium (Cr)

Chromium was detected only in three samples in concentrations ranging from ND-0.12 $\mu g/m^3$. These levels were similar to those measured in urban Taipei (Li *et al.,* 1993). Maximum concentrations occurred during the week of May 16 followed by a smaller peak for the week of September 12 (Figure 2). The mean concentration was over an order of magnitude higher than that measured at Point Petre on Lake Ontario (Hoff and Brice, 1994). The particle size distribution could not be determined due to the limited number of samples measured above the detection limit. The deposition rate for the week of May 16 was 90 $\mu g/m^2$/day. The estimated deposition rate to the entire watershed was approximately 180 kg/year (Table 7). Chromium measured in water samples exceeded water quality guidelines in both Still Creek and Brunette River (Sekela *et al.,* 1998). Corrosion of welded metal plating from vehicles is a principal source of chromium in urban areas (Ward, 1990).

4.3.11 Iron (Fe)

Iron was detected in concentrations ranging from ND-18 μg/m^3 with a mean of 4.8 μg/m^3. Maximum levels occurred during the week of June 13 (Figure 2), when precipitation samples also showed a parallel Fe peak (Belzer *et al.,* 1997) Mean concentrations were approximately 18 times higher than those measured at Agassiz in 1996 (Belzer *et al*., 1998) but similar to those measured in urban Taipei (Li *et al.,* 1993). Iron exhibited the same seasonal and particle size distribution as Al, B and Ca (Figure 3). It was found primarily in the 1.4-15.7 μm size range (Figure 3) with a large peak at 10.5 μm for spring samples (Figure 4). Deposition rates ranged from ND-18,000 μg/m^2/day (Figure 5) and followed concentration trends. Deposition rates were largest for particles ≥10.5 μm (Figure 6). The estimated deposition rate to the entire watershed was approximately 95 tonnes/year (Table 7). Iron exceeded the water quality guidelines in both Still Creek and Brunette River water samples (Sekela *et al.,* 1998) indicating that the air pathway may be significant. PCA analysis indicated that iron was associated with crustal and oceanic elements (Figure 7), suggesting natural sources.

4.3.12 Potassium (K)

Potassium was detected in concentrations ranging from ND-8.8 μg/m^3 with a mean of 4.0 μg/m^3. These levels are similar to those measured in urban Taipei (Li *et al.,* 1993). Concentration maxima did not appear to be related to the precipitation pattern (Figure 2). The particle size distribution could not be determined due to a limited number of samples measured above the detection limit. Deposition rates ranged between ND-25,000 μg/m^2/day (Figure 5). The estimated deposition rate to the entire watershed was approximately 220 tonnes/year (Table 7). PCA analysis indicated that potassium was not associated with other elements, indicating a unique source (Figure 7). Potassium sources to the area can be natural (crustal material, Chow and Watson, 1998) or anthropogenic (local residential wood burning, VanGrieken*,* 1992).

4.3.13 Magnesium (Mg)

Magnesium was detected in concentrations ranging from 3.6-180 μg/m^3 with a mean of 48 μg/m^3. This element had the same seasonal profile and particle size distribution as Al, B, Ca, Fe and Mn (Figures 2 and 3), suggesting similar sources. The highest concentrations corresponded to periods of low precipitation, indicating washout by rain events. Mean magnesium concentrations were approximately 500 times higher than in rural Abbotsford (Belzer *et al.,* 1998). Deposition rates ranged between 2,000-220,000 μg/m^2/day with the highest rates corresponding to concentration maxima (Figure 5). Deposition rates were highest for particles ≥10.5 μm (Figure 6). The estimated deposition rate to the entire Brunette River watershed was approximately 1,100 tonnes/year (Table 7). PCA analysis indicated that magnesium was associated with crustal and oceanic elements (Figure 7), suggesting natural sources.

4.3.14 Manganese (Mn)

Manganese was detected in concentrations ranging from ND-0.77 mg/m^3 with a mean of 0.17 mg/m^3. The mean concentration was approximately two orders of magnitude higher than that measured at Point Petre on Lake Ontario (Hoff and Brice, 1994) but similar to that measured in urban Taipei (Li *et al.,* 1993). Manganese had a similar seasonal profile and particle size distribution as Al, B, Ca, Fe and Mg (Figures 2 and 3). Deposition rates ranged from ND-1,100 mg/m^2/day, with maximum rates occurring for the weeks of April 11 and June 13 (Figure 5). Deposition rates were highest for particles ≥10.5 μm (Figure 6). The estimated deposition rate to the entire watershed was approximately 6.4 tonnes/year (Table 7). Manganese exceeded the provincial water quality guideline in water samples from both Still Creek and Brunette River (Sekela *et al.,* 1998), indicating that the atmospheric pathway may be important for this element. PCA analysis indicated that manganese was generally associated with crustal and oceanic elements (Figure 7). Coarse mode sources include soils and road dusts, while vehicle emissions likely account for a large part of the Mn in the fine mode (Chow and Watson, 1998). The latter is largely due to the addition of the anti-knock agent MMT (methylcyclopenpentadienyl manganese tricarbonyl) which is added to some types of commercial gasolines.

4.3.15 Molybdenum (Mo)

Molybdenum concentrations ranged between ND-0.018 μg/m^3 with a mean of 0.0018 μg/m^3. Maximum concentrations occurred the weeks of July 11 and September 19, both during periods of low precipitation (Figure 2). The particle size distribution could not be determined due to the limited number of samples measured above the detection limit. The deposition rate for the week of July 11 was 3.8 μg/m^2/day (Figure 5). The estimated deposition rate to the entire watershed was approximately 7.7 kg/year (Table 7). Molybdenum sources may include emissions from local steel product and electrical part manufacturing shops (Merck Index, 1989). Molybdenum has also been associated with an increase in traffic density (Ward, 1990).

4.3.16 Sodium (Na)

Sodium concentrations ranged from 5.0-91 μg/m^3 with a mean of 26 μg/m^3. Sodium had a similar seasonal profile and particle size distribution as Al, B, Ca, Fe, Mg and Mn (Figures 2 and 3). The highest concentrations corresponded to periods of low precipitation. Sodium particle size distributions showed a large spring peak at 10.5 μm (Figure 4) suggestive of sea salt sources (Savioe and Prospero, 1982), while the submicron fraction may be related to local emissions from glass manufacturing (Chow and Watson, 1998). Deposition rates ranged from 800-130,000 μg/m^2/day with a maximum peak the week of June 13 (Figure 5). Deposition rates were highest for particles ≥ 10.5 μm (Figure 6). The

estimated deposition rate to the entire watershed was approximately 790 tonnes/year (Table 7). PCA analysis indicated that sodium was generally associated with crustal and oceanic elements (Figure 7).

4.3.17 Phosphorus (P)

Phosphorus was detected in concentrations ranging from ND-0.89 μg/m^3 with a mean of 0.45 μg/m^3. These levels were similar to those measured in urban Taipei (Li *et al.,* 1993). The seasonal profile was unique from the other metals measured with peak concentrations occurring the weeks of July 11, September, 12 and September 26 when precipitation was low (Figure 2). The particle size distribution could not be determined due to the limited number of samples measured above the detection limit. Deposition rates ranged from ND-2,300 μg/m^2/day with a maximum peak the week of October 3 (Figure 5). The estimated deposition rate to the entire watershed was approximately 18 tonnes/year (Table 7). Phosphorus was not associated with any of the other elements in the PCA analysis, suggesting a unique source, possibly fertilizer application.

4.3.18 Lead (Pb)

Lead was detected in concentrations ranging from ND-0.14 μg/m^3 with a mean of 0.049 μg/m^3. Maximum concentrations occurred during the weeks of April 11, June 13 and August 22. A corresponding Pb peak was observed in precipitation samples for the week of April 11. Mean concentrations were similar to those measured in the Great Lakes (Strachan and Eisenreich, 1988) and generally lower than those measured in rural Abbotsford (Belzer *et al.,*1998). The particle size distribution could not be determined due to the limited number of samples measured above the detection limit. Deposition rates ranged from 1.7-288 μg/m^2/day. The estimated deposition rate to the entire watershed was approximately 1.3 tonnes/year (Table 7). Lead exceeded the federal water quality guideline in water samples from both Still Creek and Brunette River (Sekela *et al.,* 1998), indicating that the atmospheric pathway may be important for this element. PCA analysis indicated that lead was associated most closely with beryllium and manganese. Local anthropogenic sources likely include lead-acid storage battery manufacturing, plumbing, electrical soldering and use of leaded paint (Environment Canada, 1998).

4.3.19 Sulphur (S)

Sulphur concentrations ranged between 1.6-18 μg/m^3 with a mean of 6.8 μg/m^3. These levels were similar to those measured in urban Taipei (Li *et al.,* 1993). Concentration maxima occurred during the spring period (between April 11 and May 23) and corresponded to a period of low precipitation (Figure 2). Sulphur exhibited a bimodal distribution between 0.08-0.9 μm and ≥10.5 μm (Figure 3). The submicron fraction is likely dominated by ammonium sulphate aerosols (Pryor *et al*., 1997), while the coarse fraction is suggestive of sea salt sulphate

(Savoy and Prospero, 1982). Sulphur concentrations were highest in the submicron particle size range during the spring (Figure 4) suggesting possible marine sources in the form of dimethyl sulphide precursors (Kettle *et al*., 1999). Deposition rates ranged from 7,600-40,000 μg/m^2/day (Figure 5) and generally followed concentration trends. Deposition rates were highest for particles in the sedimentation mode in decreasing order from >35 to 10.5 μm (Figure 6). The estimated deposition rate to the entire watershed was approximately 440 tonnes/year (Table 7). Sulphur was associated with wind direction in the PCA analysis (Figure 7). As the highest sulphur levels occurred during weeks when the prevailing winds were from the southwest, this suggests either a marine source from the Georgia Strait and/or anthropogenic inputs from fossil fuel combustion and cement and glass manufacturing from sources southwest of Burnaby Lake.

4.3.20 Selenium (Se)

Selenium was detected only in four samples corresponding to the weeks of April 11, April 25, August 8 and October 10 (Figure 2). Concentrations ranged from ND-0.014 μg/m^3. These levels were approximately one order of magnitude lower than those measured in urban Taipei (Li *et al.,* 1993). The particle size distribution could not be ascertained due to insufficient data above the detection limit. Deposition rates ranged from ND-19 μg/m^2/day with a maximum for the week of August 8 (Figure 5). The estimated deposition rate to the entire watershed was approximately 42 kg/year (Table 7). Local selenium sources may include incineration of refuse and combustion of oil and gasoline (Kitto, 1993).

4.3.21 Strontium (Sr)

Strontium was detected in concentrations ranging from 1.2-26 μg/m^3 with a mean of 7.3 μg/m^3. It's seasonal profile (Figure 2) and particle size distribution (Figure 3) closely matched that of Al, B, Ca, Fe, Mg, Mn and Na. Concentration maxima occurred for the weeks of June 13, August 22 and September 12 (Figure 2). For the latter week, a parallel concentration peak was observed in precipitation samples (Belzer et al., 1997). Mean concentrations were over three orders of magnitude higher than those measured in rural Abbotsford (Belzer *et al.*, 1998). Deposition rates ranged from 600-34,000 μg/m^2/day with the highest rates corresponding to concentration maxima (Figure 5). Deposition rates were highest for the 15.7 μm size fraction (Figure 6). The estimated deposition rate to the entire watershed was approximately 170 tonnes/year (Table 7). Strontium was associated with natural source elements in the PCA analysis (Figure 7) suggesting oceanic sources.

4.3.22 Tellurium (Te)

Tellurium was detected only in two samples having concentrations of 0.05 and 0.11 μg/m^3, respectively (Figure 2). The particle size distribution could not be determined due to the limited number of samples measured above the detection

limit. The deposition rates were 9.1 and 24 μg/m^2/day for the two samples in which this element was detected (Figure 5). The estimated deposition rate to the entire watershed was approximately 66 kg/year (Table 7). Tellurium is used as coloring agent in chinaware, porcelains and enamels and in the manufacture of special alloys of marked electrical resistance (Merck Index, 1989).

4.3.23 Titanium (Ti)

Titanium was detected in concentrations ranging from 0.39-3.8 μg/m^3 with a mean of 1.7 μg/m^3. Concentration maxima occurred during the weeks August 22, September 12 and September 26 (Figure 2). A corresponding peak was also noted in precipitation samples for the week of September 12 (Belzer *et al.,* 1997). Mean concentrations were approximately 50 times higher than those measured in rural Abbotsford (Belzer *et al.,* 1998) but several times lower than those measured in urban Taipei (Li *et al.,* 1993). The particle size distribution was trimodal with peaks in the <0.08 and 1.4-3.3 and 10.5-15.7 μm size ranges (Figure 3). Deposition rates ranged from 75-4,300 μg/m^2/day with a maximum for the week of August 22 (Figure 5). Deposition rates were highest for the 10.5 and 15.7 μm size fractions (Figure 6). The estimated deposition rate to the entire watershed was approximately 35 tonnes/year (Table 7). Titanium was associated with crustal and oceanic elements in the PCA analysis (Figure 7) which is consistent with it's known association with soil dusts (Chow and Watson, 1994). Anthropogenic sources also exist and include metal processing, cosmetics and paint production.

4.3.24 Vanadium (V)

Vanadium was detected in concentrations ranging from ND-0.23 μg/m^3 with a mean of 0.064 μg/m^3. Mean concentrations were approximately double than those measured in rural Abbotsford (Belzer *et al.,* 1998) but similar to those measured in urban Taipei (Li *et al.,* 1993). This element had a seasonal concentration profile similar to that of Ti (Figure 2). Vanadium exhibited a trimodal distribution similar to that of natural source elements such as Al, Ca and Fe (Figure 3). Deposition rates ranged from ND-180 μg/m^2/day with a maximum for the week of August 22 (Figure 5). The highest deposition rates were in the 10.5 and 15.7 μm size fractions (Figure 6), which is similar to that observed for titanium. The estimated deposition rate to the entire watershed was approximately 1.1 tonnes/year (Table 7). Anthropogenic emissions from oil and gas refineries (Chow and Watson, 1994) and metal plating (Ward, 1990) may be the primary source of the fine particle fraction (<0.08 μm) which may be condensing on natural source coarse particles.

4.3.25 Zinc (Zn)

Zinc was detected in only two samples (April 11 and October 3) at 0.76 and 0.58 μg/m^3, respectively (Figure 2). Precipitation samples showed a corresponding

peak for the week of April 11 (Belzer *et al*., 1997). Particulate concentrations were approximately four times higher than those measured at Abbotsford in 1996 (Belzer *et al.,* 1998) but similar to those measured in urban Taipei (Li *et al.,* 1993). The particle size distribution could not be determined due to an insufficient number of samples above the detection limit. Deposition rates were 150 and 6,800 μg/m^2/day for the April 11 and October 3 samples, respectively (Figure 5). The estimated deposition rate to the entire watershed was approximately 14 tonnes/year (Table 7). Zinc exceeded the federal and provincial water quality guidelines in water samples from both Still Creek and Brunette River (Sekela *et al.,* 1998). Zinc sources include automobile wear and tear, metal smelting and refuse burning (VanGrieken*,* 1992).

4.3.26 Zirconium (Zr)

Zirconium concentrations ranged between ND-0.46 μg/m^3 with a mean of 0.20 μg/m^3. Concentration maxima occurred during late summer and early fall, coinciding with periods of low precipitation (Figure 2). The particle size distribution was bimodal at ≤ 0.08 μm and between 1.4-15.7 μm (Figure 3). Deposition rates ranged from ND-590 μg/m^2/day with a maximum for the week of August 22 (Figure 5). In increasing order, deposition rates were highest for the 10.5->35 μm size fractions (Figure 6). The estimated deposition rate to the entire watershed was approximately 6.2 tonnes/year (Table 7). Local zirconium sources may include glass manufacturing and powder metallurgy (Merck Index, 1989). Condensation of primary zirconium-rich aerosols on coarse particles likely accounts for its presence in the sedimentation mode size range (≥ 10.5 μm).

5. CONCLUSION

Twenty-six of the 32 metals measured were detected in atmospheric aerosols at Burnaby Lake. Of these, 14 were assessed for particle size distribution, while the remaining 12 were assessed for total concentrations for the sum of particle size fractions, due to the large frequency of samples below the detection limit.

Aluminum, boron, calcium, iron, magnesium, manganese, sodium and strontium had a similar time series pattern and particle size distribution. For these metals, maximum concentrations occurred during weeks of low precipitation with a large peak the week of June 13 followed by multiple smaller peaks in the late summer-early fall period. This is consistent with a westward transport of marine aerosols in the region and elevated concentrations of geological material (Chow and Watson, 1998). The particle size distribution was trimodal with peaks at <0.08, 1.4-3.3 and 10.5-15.5 μm. The presence of these metals in the ultrafine fraction (<0.08 μm) is suggestive of gaseous precursors, likely of anthropogenic source, while larger sized particles, especially those >10 μm, point to natural sources such as soil dusts and sea salt.

PCA analysis indicated similar temporal patterns for aluminum, barium, calcium, iron, magnesium, manganese, sodium, strontium and titanium. Crustal materials likely account for the first four elements, while the last three elements are most likely derived from marine aerosols. Phosphorus, sulphur and potassium were not associated with any other metals, indicating unique sources. Sulphur was associated with southwesterly winds, suggesting a marine source.

Metal concentrations were generally one to three orders of magnitude higher than those measured in rural Abbotsford in 1996 but similar to those measured in urban Taipei, Taiwan. Exceptions were found for aluminum and calcium which had higher concentrations at Burnaby Lake. Concentrations of the highly toxic metals, arsenic, cadmium and lead, were within current air quality guidelines, however boron exceeded the Ontario Ministry of Environment ambient air quality standard in two of the sixteen samples.

Deposition velocities ranged between 0.22 and 13 cm/s with the highest values corresponding to the size fractions >10 μm. Total deposition rates varied for each metal with mean values ranging between 0.35 $\mu g/m^2$/day to 490 mg/m^2/day. Depending on the metal, yearly loadings to the watershed ranged from <10 kg to several thousand tonnes. Calcium, aluminum, boron and magnesium had the highest metal loadings to the watershed. Manganese and zinc also had relatively high loadings, a reflection of the high traffic density in the area.

In conclusion, the air pathway appears to be an important source of metals to the Burnaby Lake area. The relatively high metal concentrations measured at the site are a reflection of the highly urbanized location of the lake, receiving inputs from a multitude of natural and anthropogenic sources. The relatively high metal deposition rates to the area indicates that the metal contribution from atmospheric sources may represent a significant portion of the total metal load to the Brunette River watershed, while the reported exceedence of water quality guidelines and criteria for several metals in local rivers suggests that aquatic life may be at risk in the more urbanized reaches.

6. ACKNOWLEDGMENTS

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8. TABLES

Table 1. Sample Collection Information for Metal Samples Collected by LPI

Week	Substrate Type	Date On	Time on	Date off	Time off	Time elapsed (min.)	Ambient Pressure (mb)	Ambient Pressure ("Hg) Pa	Initial Pressure at Critical Orifice (mm Hg)	Final Pressure at Critical Orifice (mm Hg)	Average Pressure at Critical Orifice (mm Hg)	Average Pressure at Critical Orifice ("Hg) (Pco)
1	glass fibre	11-Apr	09:10	18-Apr	08:30	10040	1018	30.10	114	115	114.5	4.51
2	glass fibre	25-Apr	08:45	02-May	09:30	10125	1009	29.83	114	114	114	4.49
3	glass fibre	16-May	n/a	23-May	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
4	glass fibre	30-May	07:40	06-Jun	07:30	10070	1013	29.95	114	114	114	4.49
5	glass fibre	13-Jun	10:00	20-Jun	07:30	9930	1010	29.87	114	110	112	4.41
6	glass fibre	04-Jul	08:50	11-Jul	08:10	10040	1014	29.98	121	114	117.5	4.63
7	glass fibre	11-Jul	08:55	18-Jul	07:30	10055	1018	30.10	119	114	116.5	4.59
8	glass fibre	25-Jul	09:15	01-Aug	08:00	10005	1015	30.01	114	114	114	4.49
9	glass fibre	08-Aug	n/a	15-Aug	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
10	glass fibre	22-Aug	08:00	29-Aug	07:55	10075	1014	29.98	114	112	113	4.45
11,12	glass fibre	29-Aug	08:00	12-Sep	09:00	20220	1014	29.98	114	112	113	4.45
13	glass fibre	12-Sep	09:30	19-Sep	08:00	9990	1015	30.01	114	116	115	4.53
14	glass fibre	19-Sep	08:30	26-Sep	08:10	10060	1015	30.01	114	120	117	4.61
15	glass fibre	26-Sep	08:50	03-Oct	10:00	10150	1012	29.92	114	100	107	4.22
16	glass fibre	03-Oct	10:30	10-Oct	08:30	9960	1015	30.01	114	112	113	4.45
17	glass fibre	10-Oct	09:05	17-Oct	08:00	10015	1016	30.04	114	112	113	4.45

Notes:
n/a indicates data missing
(1) from flow calibration graph provided by Graseby Andersen
(2) estimated volume- field data missing

Table 2. Meteorological Data Collected at Burnaby Lake During the Sampling Period

Week	Start	Stop	Wind Direction*	Wind Speed (m/s)**	Temp. (°C)	Pressure (mb)	RH (%)	Precipitation (mm)
1	Apr-11-95	Apr-17-95	S, SW	1.7	7.9	1013	78.1	24.0
2	Apr-25-95	Apr-28-95	SW, SE	1.5	15.1	1009	64.6	0.0
3	May-16-95	May-22-95	SW	1.6	14.4	1016	69.3	0.4
4	May-30-95	Jun-05-95	SE and S	1.6	16.8	1013	73.9	8.8
5	Jun-13-95	Jun-19-95	SE, E, W and SW	1.7	14.9	1010	83.3	9.2
6	Jul-04-95	Jul-10-95	SE	1.5	17.9	1014	78.9	19.6
7	Jul-11-95	Jul-17-95	SE, NW	1.9	19.8	1018	73.1	0.0
8	Jul-25-95	Jul-31-95	SW and SE	1.9	17.4	1015	75.9	51.0
9	Aug-08-95	Aug-13-95	E	1.9	15.6	1014	85.6	11.2
10	Aug-22-95	Aug-28-95	S	1.4	15.8	1014	80.1	7.2
11	Aug-29-95	Sep-04-95	E, NE	n/a	17.0	1014	80.5	9.4
12	Sep-12-95	Sep-18-95	NE	n/a	18.2	1015	82.6	1.6
13	Sep-19-95	Sep-25-95	NE	n/a	15.7	1015	76.0	4.4
14	Sep-26-95	Oct-02-95	E and NE	n/a	13.2	1012	90.0	33.6
15	Oct-03-95	Oct-09-95	E	1.7	11.5	1015	90.9	89.8
16	Oct-10-95	Oct-16-95	SE	1.3	11.3	1016	92.5	76.6

Values represent means for each sampling period.
n/a denotes data not available due to equipment failure.
RH indicates relative humidity.
* Prevailing wind direction.
** Average wind speed derived from 5 minute intervals within the sampling period.

Table 3. Metal Levels (μg) in Glass Fibre Filter Substrate Blanks

Parameter	Detection Limit	Glass fibre Field blank 30-May	Glass fibre Lab Blank 29-Aug	Glass fibre Lab Blank 12-Sep	Glass fibre Lab Blank 12-Sep	Glass fibre Lab Blank 19-Sep	Glass fibre Lab Blank 19-Sep	Glass fibre Lab Blank 03-Oct	Glass fibre Lab Blank 03-Oct	Glass fibre Lab Blank 26-Oct	Glass fibre Lab Blank 26-Oct	Glass fibre Lab Blank 10-Oct	Glass fibre Lab Blank 10-Oct	**Mean Glass Fibre Blanks**
Ag	0.0080	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**ND**
Al	5.0	740	418	430	150	233	846	102	163	280	404	179	367	**359**
As	0.040	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**ND**
B	3.0	170	121	116	37	66	254	24	43	85	124	50	104	**100**
Ba	0.075	1.5	1.3	2.0	2.1	1.7	2.2	1.7	0.78	2.7	1.3	3.1	1.7	**1.8**
Be	0.015	0.015	ND	ND	ND	ND	ND	ND	ND	0.016	0.020	ND	ND	**0.0042**
Bi	2.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**ND**
Ca	40	1700	952	1050	407	582	1950	282	451	713	955	498	1024	**880**
Cd	4.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**ND**
Co	0.23	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**ND**
Cr	1.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**ND**
Cu	45	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**ND**
Fe	38	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**ND**
K	30	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	35	**2.9**
Mg	1.5	180	105	114	44	62	211	27	44	76	107	46	97	**93**
Mn	0.75	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**ND**
Mo	0.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**ND**
Na	30	120	61	85	60	84	138	101	66	120	90	147	172	**104**
Ni	1.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**ND**
P	3	ND	ND	3.4	4.6	ND	3.5	ND	ND	ND	3.3	4.0	ND	**1.6**
Pb	38	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**ND**
S	7.5	21	19	27	24	25	26	31	31	37	21	48	61	**31**
Sb	11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**ND**
Se	0.040	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**ND**
Si	8.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**ND**
Sn	2.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**ND**
Sr	13	23	ND	15	ND	ND	26	ND	ND	ND	13	ND	15	**7.7**
Te	1.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**ND**
Ti	5.3	11	6.6	9.8	6.6	7.3	14	5.5	6.9	11	8.0	10	15	**9.3**
Tl	2.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**ND**
V	0.38	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**ND**
Zn	13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**ND**
Zr	0.45	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.60	0.58	**0.10**

ND indicates not detected.

Table 4. QA/QC Assessment of Metals in LPI Samples from Burnaby Lake

Group 1	Group 2	Group 3
Ag	Al	Bi
Be	As	Cu
Cd	B	Ni
Co	Ba	Sb
Cr	Ca	Sn
K	Fe	Tl
Mo	Mg	
P	Mn	
Pb	Na	
Se	S	
Te	Sr	
Zn	Ti	
	V	
	Zr	

Group 1 - size fractions not quantifiable - high frequency of ND values
Group 2 - size fractions quantifiable
Group 3 - not detected

Table 5. Statistical Summary for Trace Metal Concentrations (µg/m^3) in LPI samples from Burnaby Lake - Sums of All Particulate Fractions (n=16)

Parameter	mean	standard deviation	minimum	maximum
Ag	0.0014	0.0038	ND	0.015
Al	200	190	13	760
As	0.023	0.068	ND	0.28
B	55	50	3.3	180
Ba	0.24	0.30	0.0052	1.1
Be	0.0024	0.0053	ND	0.022
Bi	ND	ND	ND	ND
Ca	480	450	41	1800
Cd	0.00039	0.0012	ND	0.0045
Co	0.0050	0.0092	ND	0.030
Cr	0.012	0.032	ND	0.12
Cu	ND	ND	ND	ND
Fe	4.8	4.8	ND	18
K	4.0	2.4	ND	8.8
Mg	48	45	3.6	180
Mn	0.17	0.19	ND	0.77
Mo	0.0018	0.0052	ND	0.018
Na	26	21	5.0	91
Ni	ND	ND	ND	ND
P	0.45	0.22	ND	0.89
Pb	0.049	0.043	ND	0.14
S	6.8	4.3	1.6	18
Sb	ND	ND	ND	ND
Se	0.0022	0.0046	ND	0.014
Sn	ND	ND	ND	ND
Sr	7.3	6.3	1.2	26
Te	0.010	0.030	ND	0.11
Ti	1.7	0.92	0.39	3.8
Tl	ND	ND	ND	ND
V	0.064	0.069	ND	0.23
Zn	0.084	0.23	ND	0.76
Zr	0.20	0.13	ND	0.46

ND indicates not detected.

Table 6. Statistical Summary for Trace Metal Deposition Rates (μg/m^2/day) for the Sum of All Particle Size Fractions in Atmospheric Samples from Burnaby Lake (April 11-October 10, 1995) (n=11)

Parameter	mean	standard deviation	minimum	maximum
Ag	5.8	13	ND	39
Al	200000	270000	8000	930000
As	91	290	ND	960
B	53000	67000	2200	220000
Ba	210	360	0.86	1100
Be	3.0	8.1	ND	27
Bi	ND	ND	ND	ND
Ca	490000	650000	17000	2300000
Cd	1.1	3.6	ND	12
Co	5.7	17	ND	55
Cr	8.2	27	ND	90
Cu	ND	ND	ND	ND
Fe	4300	5500	ND	18000
K	9700	8800	ND	25000
Mg	49000	64000	2000	220000
Mn	290	420	ND	1100
Mo	0.35	1.2	ND	3.8
Na	36000	37000	800	130000
Ni	ND	ND	ND	ND
P	800	640	ND	2300
Pb	59	87	ND	290
S	20000	10000	7600	40000
Sb	ND	ND	ND	ND
Se	1.9	5.6	ND	19
Sn	ND	ND	ND	ND
Sr	79000	9600	600	34000
Te	3.0	7.4	ND	24
Ti	1600	1400	75	4300
Tl	ND	ND	ND	ND
V	48	61	ND	180
Zn	630	2000	ND	6800
Zr	280	200	ND	590

ND indicates not detected.

Table 7. Estimates of Yearly Metal Deposition Rates for the Sum of Particle Size Fractions in Atmospheric Samples from Burnaby Lake (April 11-October 10, 1995) (n=11)

Parameter	mean deposition rate ($\mu g/m^2/day$)	Estimated deposition rate/yr ($g/m^2/yr$)	Estimated deposition rate to total watershed (kg/yr)	Estimated deposition rate to total watershed (tonnes/yr)
Ag	5.8	0.0021	128	0.13
Al	200000	75	4500000	4500
As	91	0.033	2000	2.0
B	53000	19	1200000	1200
Ba	210	0.077	4600	4.6
Be	3.0	0.0011	67	0.067
Bi	ND	ND	ND	ND
Ca	490000	180	11000000	11000
Cd	1.1	0.00040	24	0.024
Co	5.7	0.0021	130	0.13
Cr	8.2	0.0030	180	0.18
Cu	ND	ND	ND	ND
Fe	4300	1.6	95000	95
K	9700	3.6	220000	220
Mg	49000	18	1100000	1100
Mn	290	0.11	6400	6.4
Mo	0.35	0.00013	7.7	0.0077
Na	36000	13	790000	790
Ni	ND	ND	ND	ND
P	800	0.29	18000	18
Pb	59	0.022	1300	1.3
S	20000	7.3	440000	440
Sb	ND	ND	ND	ND
Se	1.9	0.00069	42	0.042
Sn	ND	ND	ND	ND
Sr	7900	2.9	170000	170
Te	3.0	0.0011	66	0.066
Ti	1600	0.59	35000	35
Tl	ND	ND	ND	ND
V	48	0.018	1100	1.1
Zn	630	0.23	14000	14
Zr	280	0.10	6200	6.2

ND indicates not detected.

Table 8. Principal Component Loadings for Analysis of Metals in Weekly LPI samples (concentrations based on sum of all particle fractions)

Component Number	Al	B	BA	BE	CA	FE	K	MG	MN	NA	P	Pb	S	SR	TI	ZR	Temperature	Precipitation	Wind Direction
1	0.973	0.976	0.846	0.592	0.980	0.968	-0.102	0.981	0.884	0.925	-0.036	0.674	0.023	0.989	0.846	0.294	0.022	-0.521	-0.008
2	0.175	0.155	0.016	-0.348	0.136	0.056	-0.767	0.141	-0.365	-0.308	-0.068	-0.507	-0.497	0.040	0.076	0.169	0.682	-0.487	-0.418

9. FIGURES

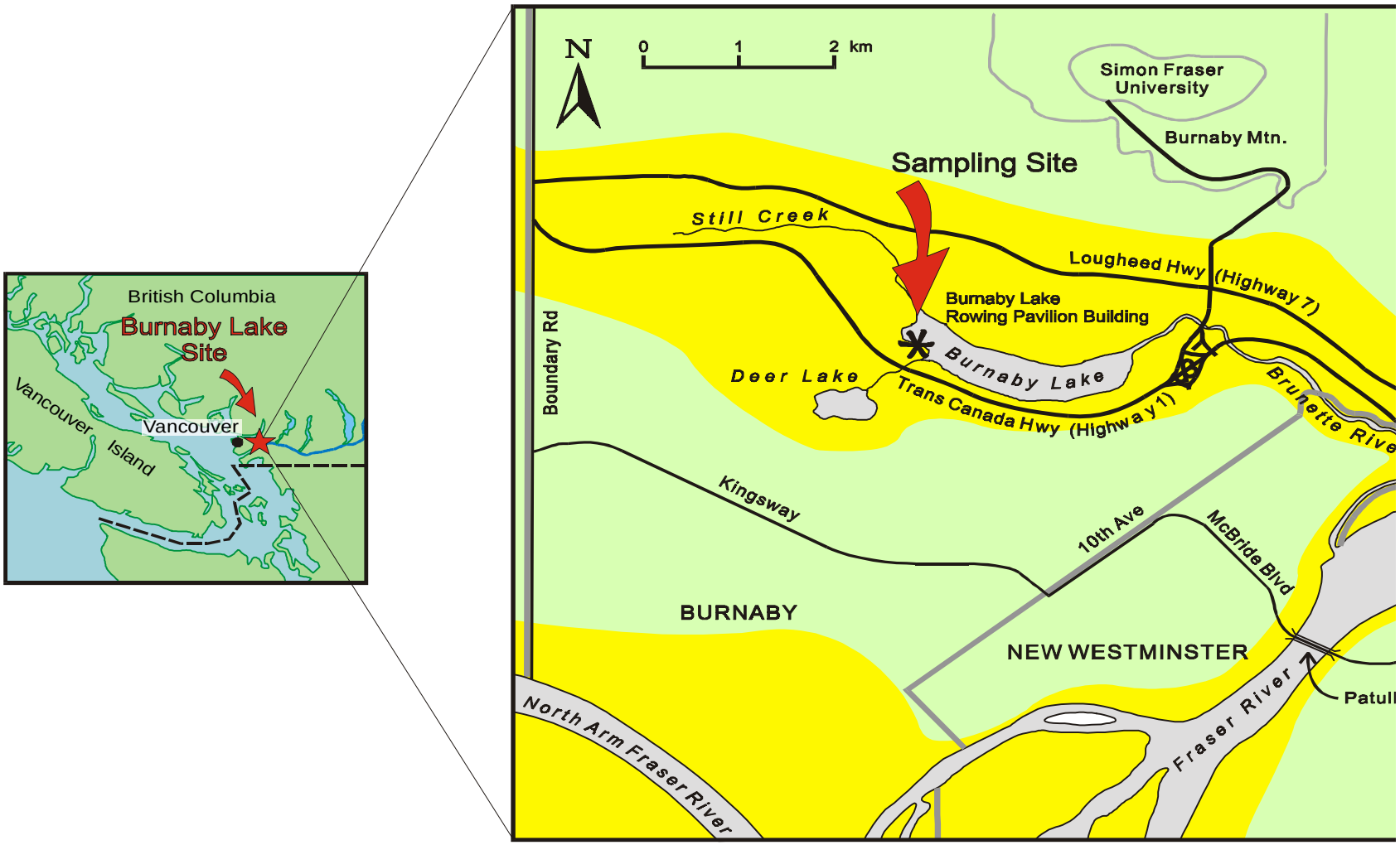

Figure 1. Map of Burnaby Lake and surrounding area.

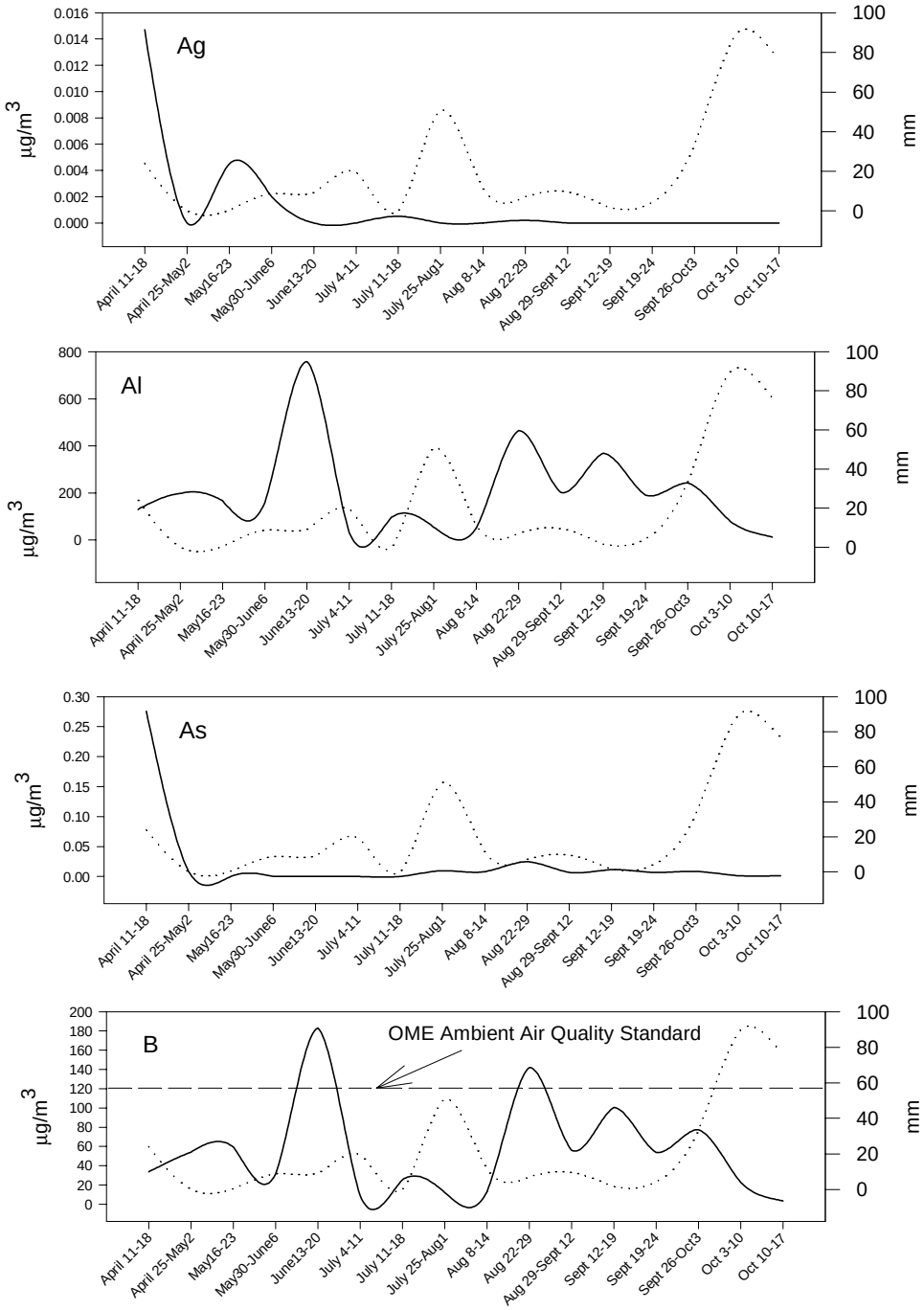

Figure 2. Metal concentrations for the sum of all particle size fractions (solid line µg/m^3) and precipitation (dashed line, mm) during the sampling period.

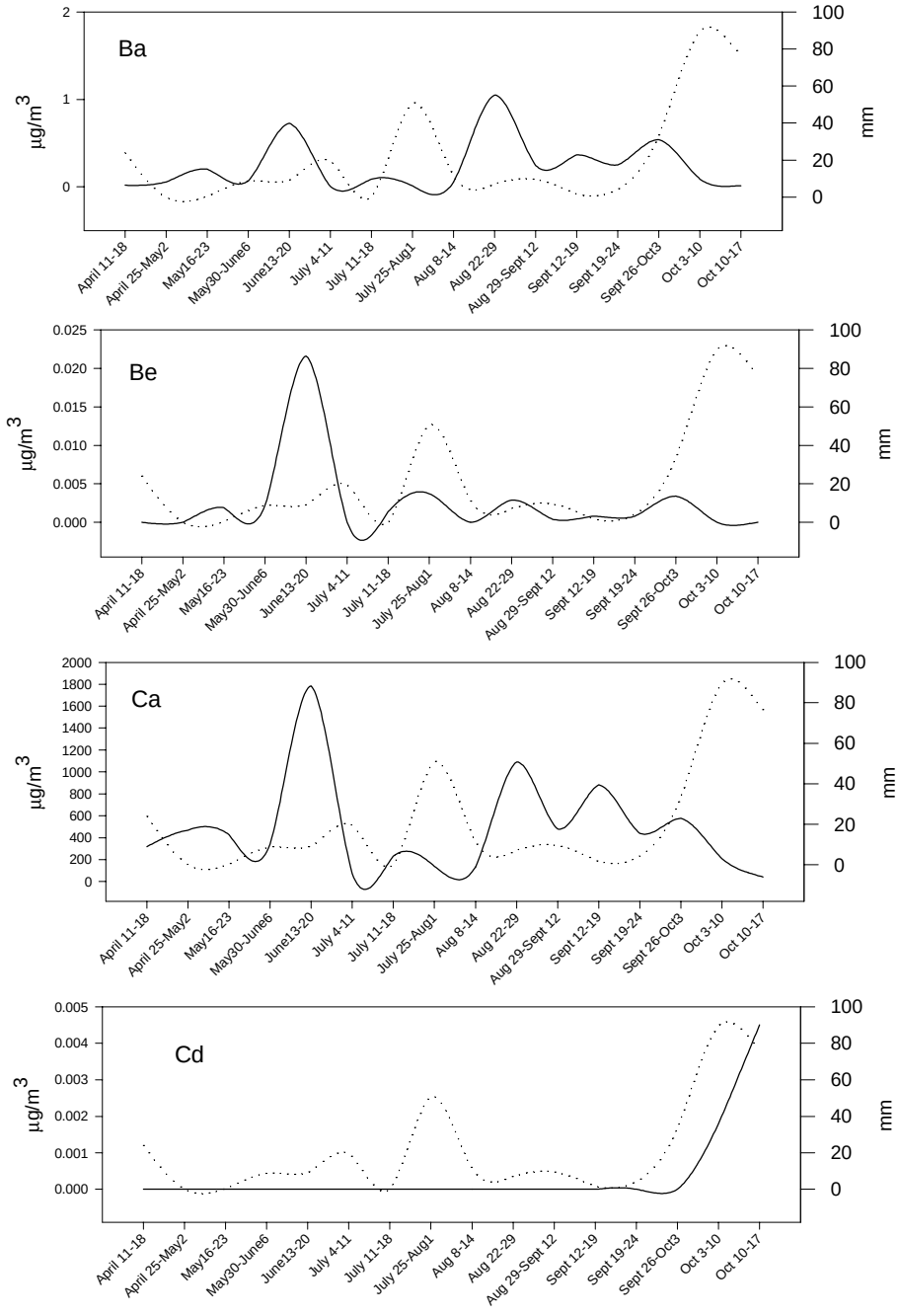

Figure 2 (continued). Metal concentrations for the sum of all particle size fractions (solid line µg/m^3) and precipitation (dashed line, mm) during the sampling period.

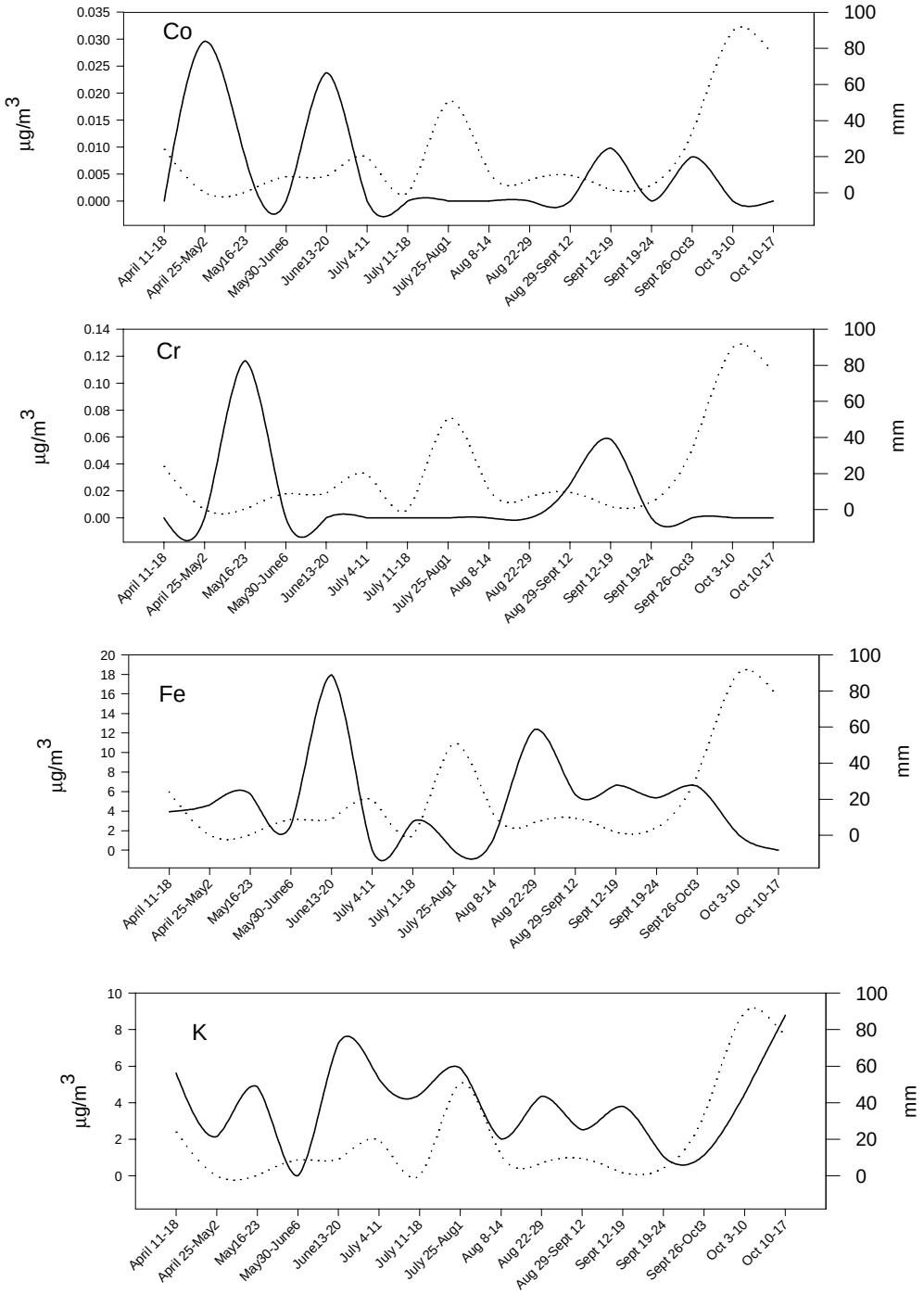

Figure 2 (continued). Metal concentrations for the sum of all particle size fractions (solid line µg/m^3) and precipitation (dashed line, mm) during the sampling period.

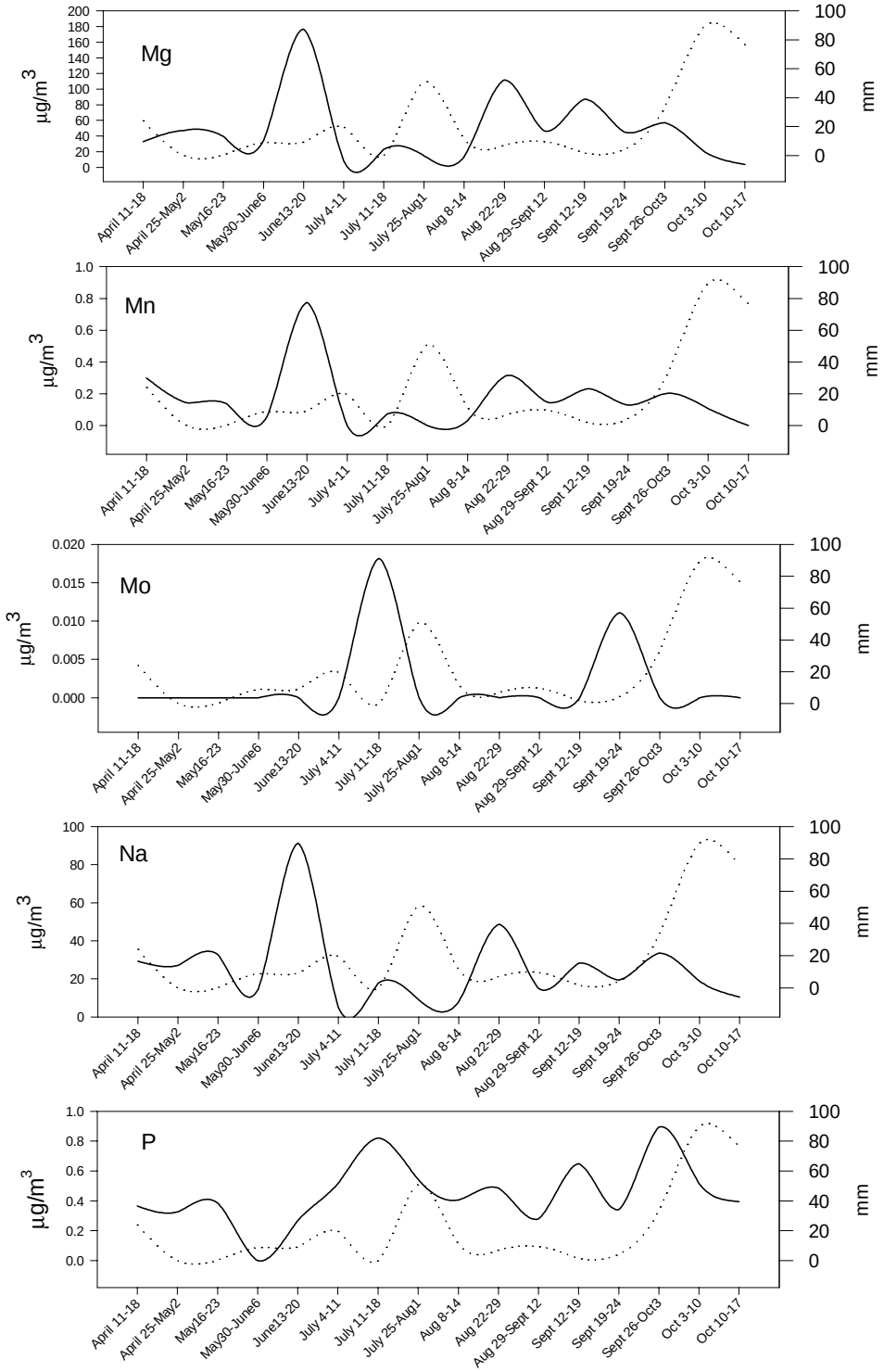

Figure 2 (continued). Metal concentrations for the sum of all particle size fractions (solid line µg/m^3) and precipitation (dashed line, mm) during the sampling period.

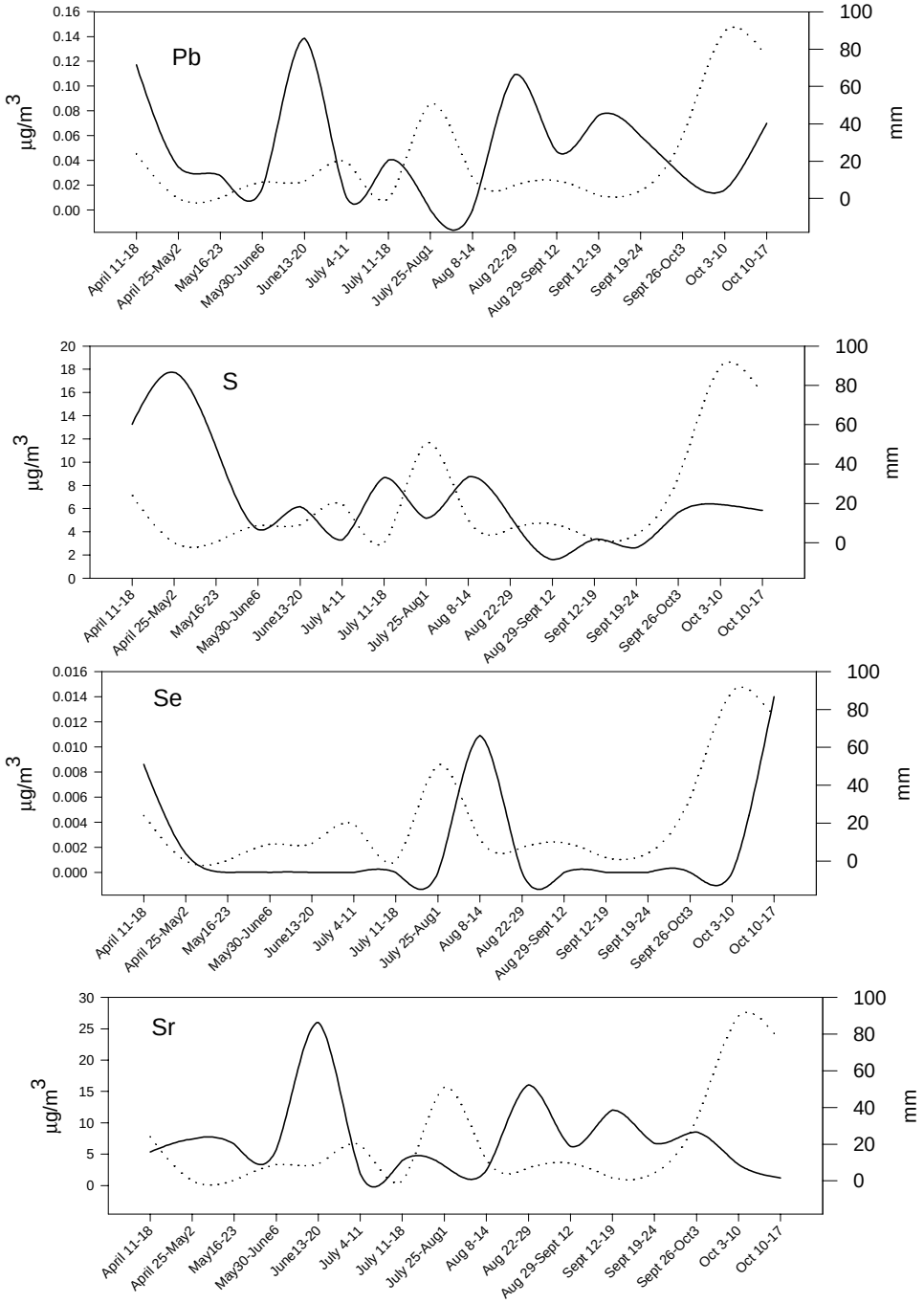

Figure 2 (continued). Metal concentrations for the sum of all particle size fractions (solid line µg/m^3) and precipitation (dashed line, mm) during the sampling period.

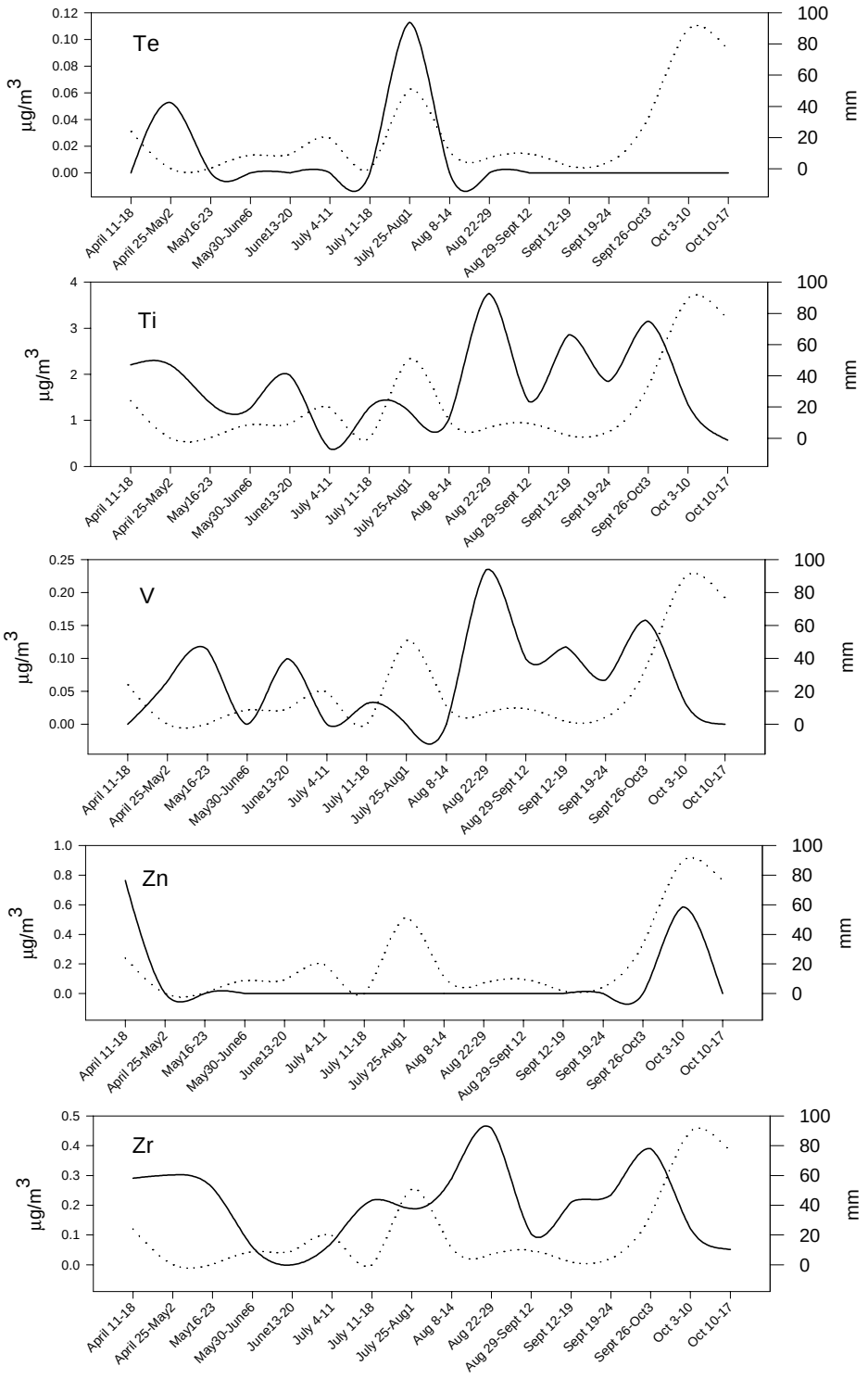

Figure 2 (continued). Metal concentrations for the sum of all particle size fractions (solid line µg/m^3) and precipitation (dashed line, mm) during the sampling period.

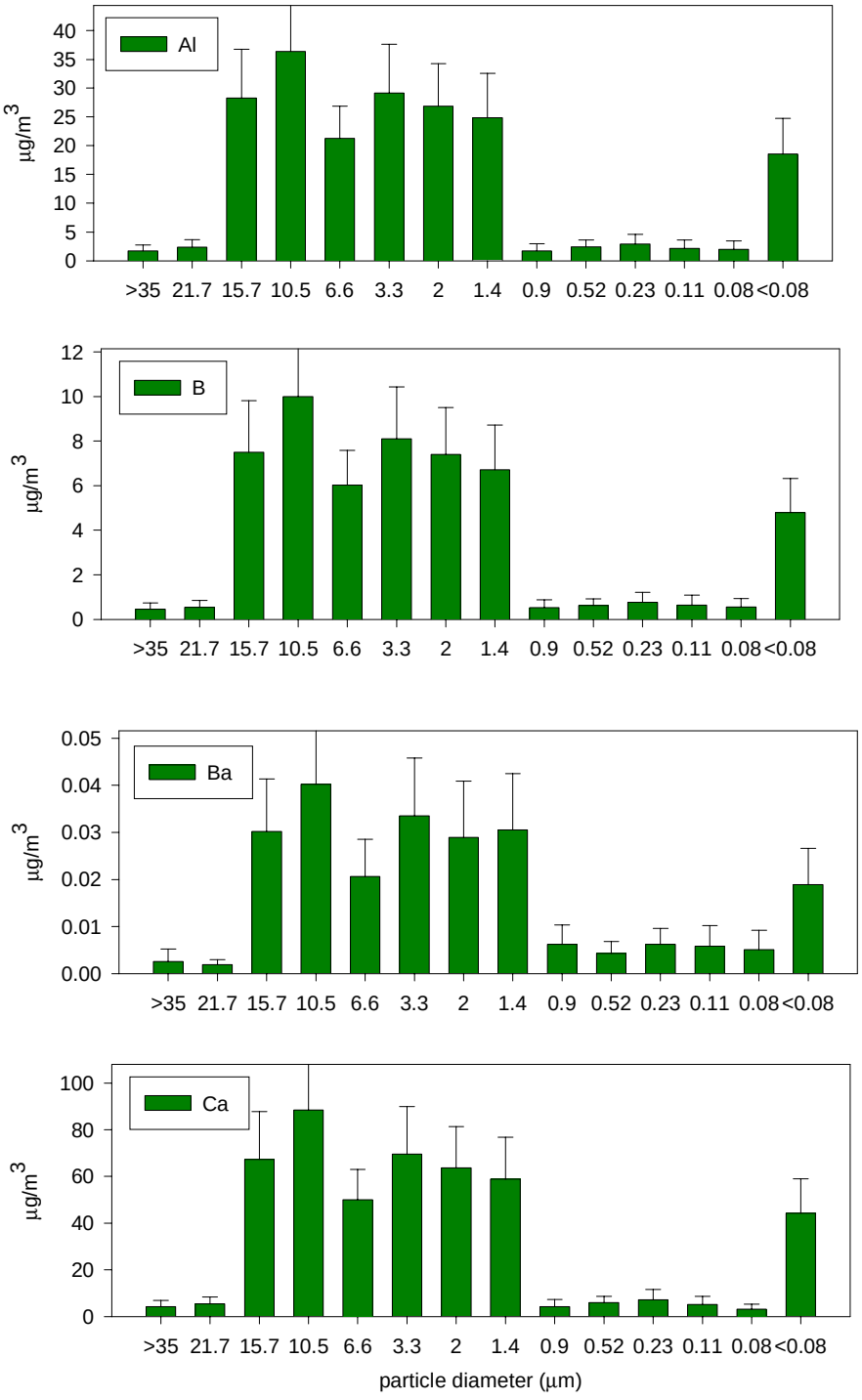

Figure 3. Size fractionated mean metal concentrations (µg/m^3, +/-SE) in LPI samples (n=16).

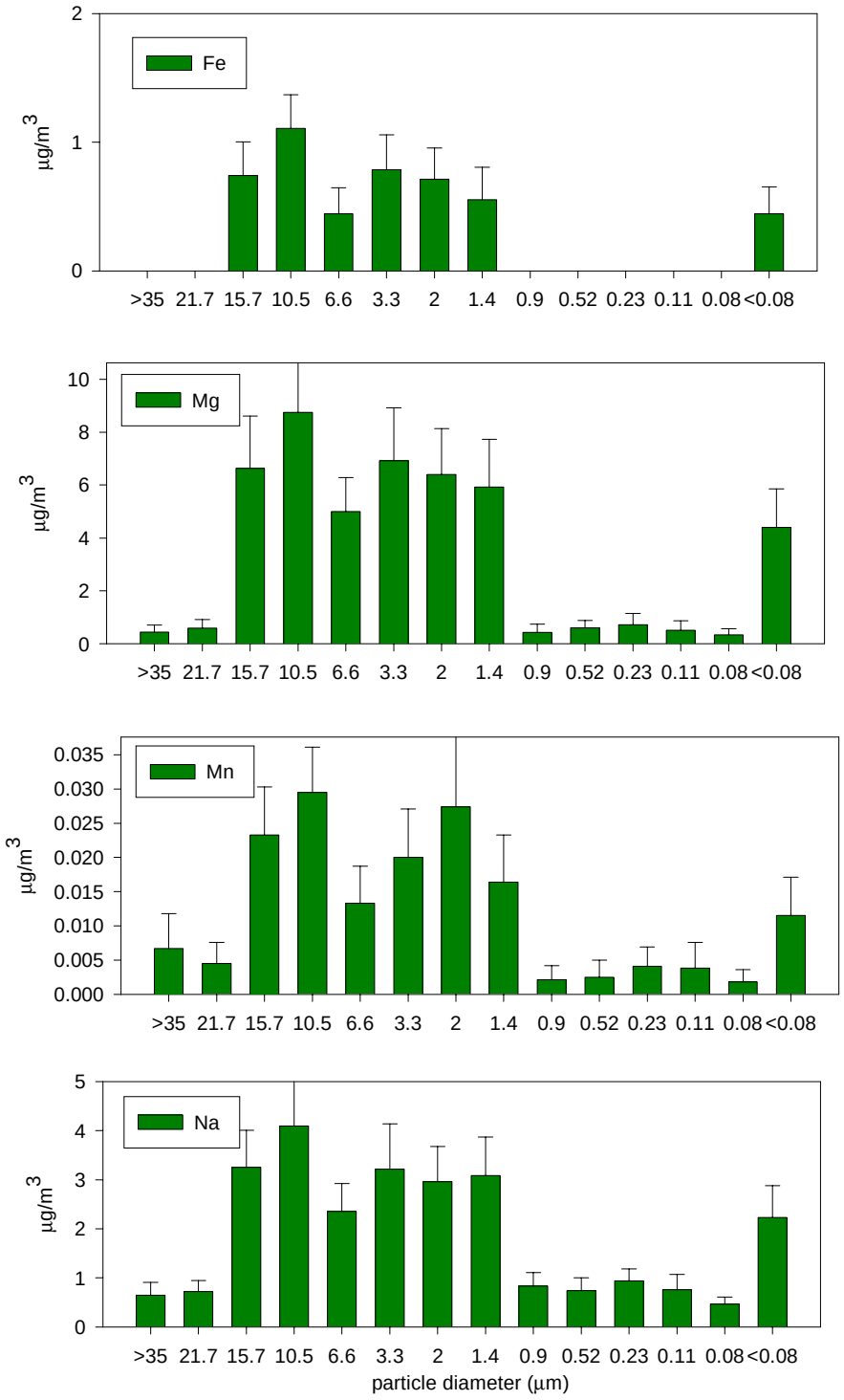

Figure 3 (continued). Size fractionated mean metal concentrations (µg/m^3, +/-SE) in LPI samples (n=16).

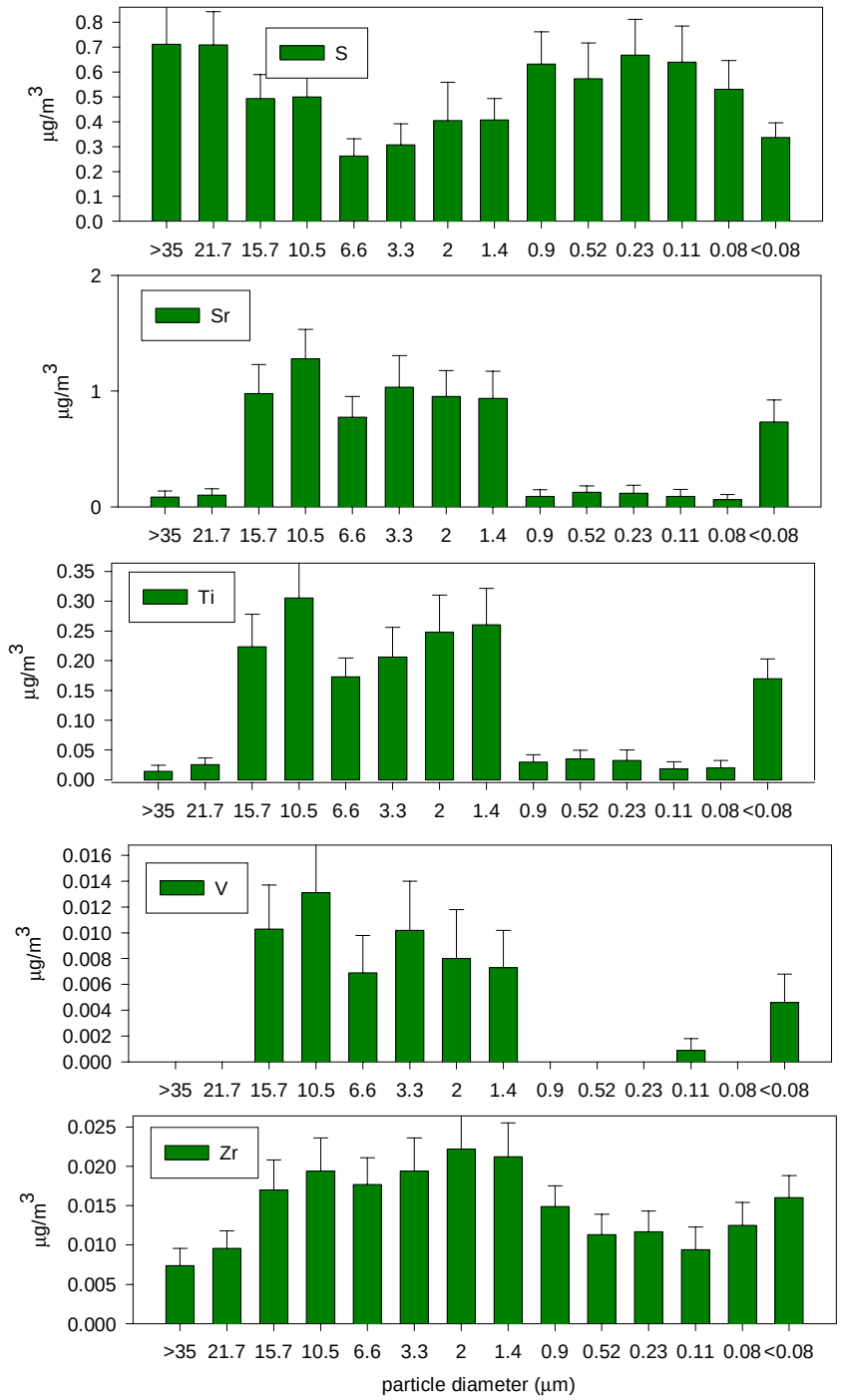

Figure 3 (continued). Size fractionated mean metal concentrations (µg/m^3, +/-SE) in LPI samples (n=16).

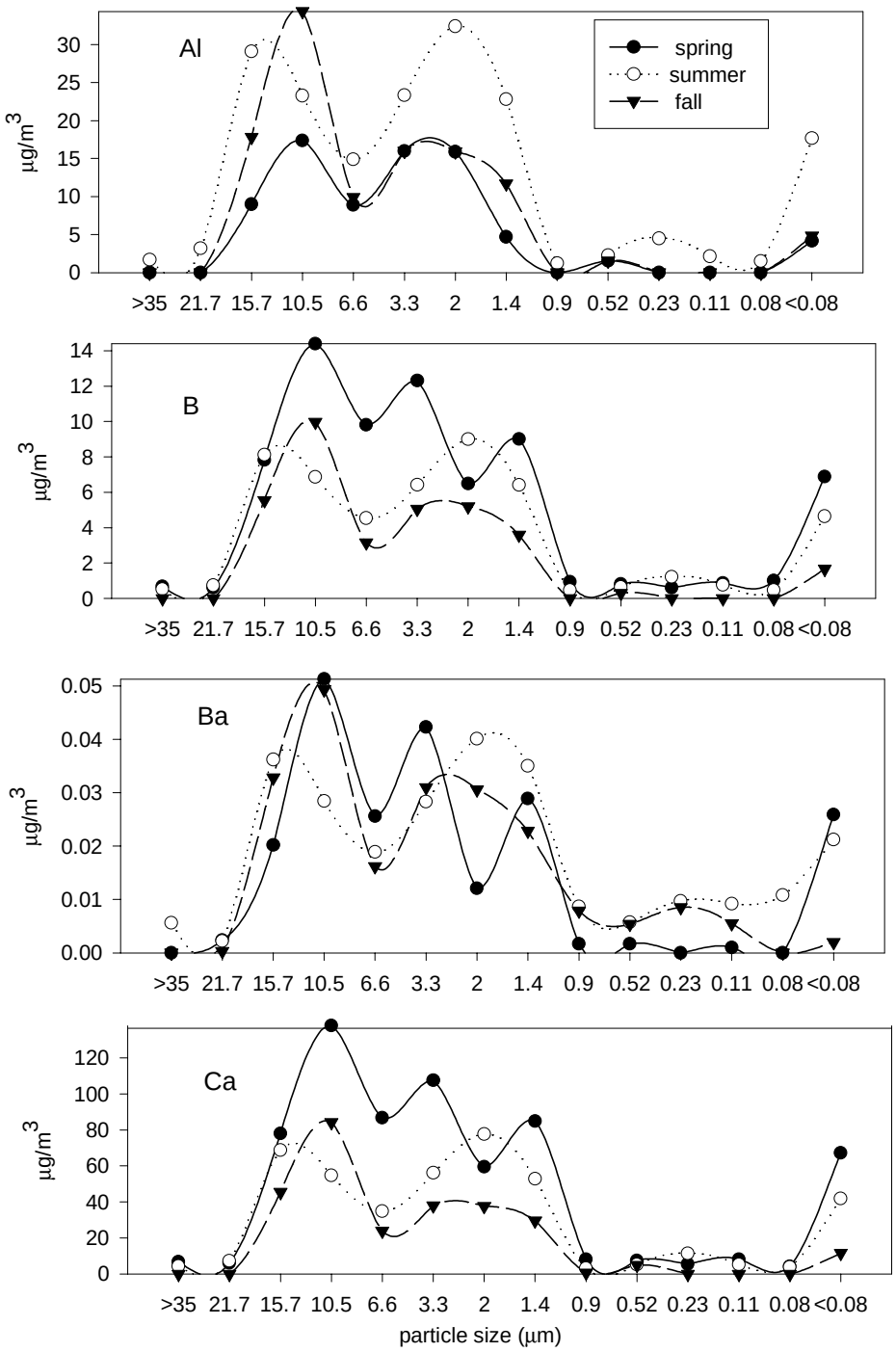

Figure 4. Size fractionated mean metal concentrations (µg/m^3) by season (spring n=5, summer n=6, fall n=5). Spring: April 11-June 20; Summer: July 4-September 12; Fall: September 12-October 17.

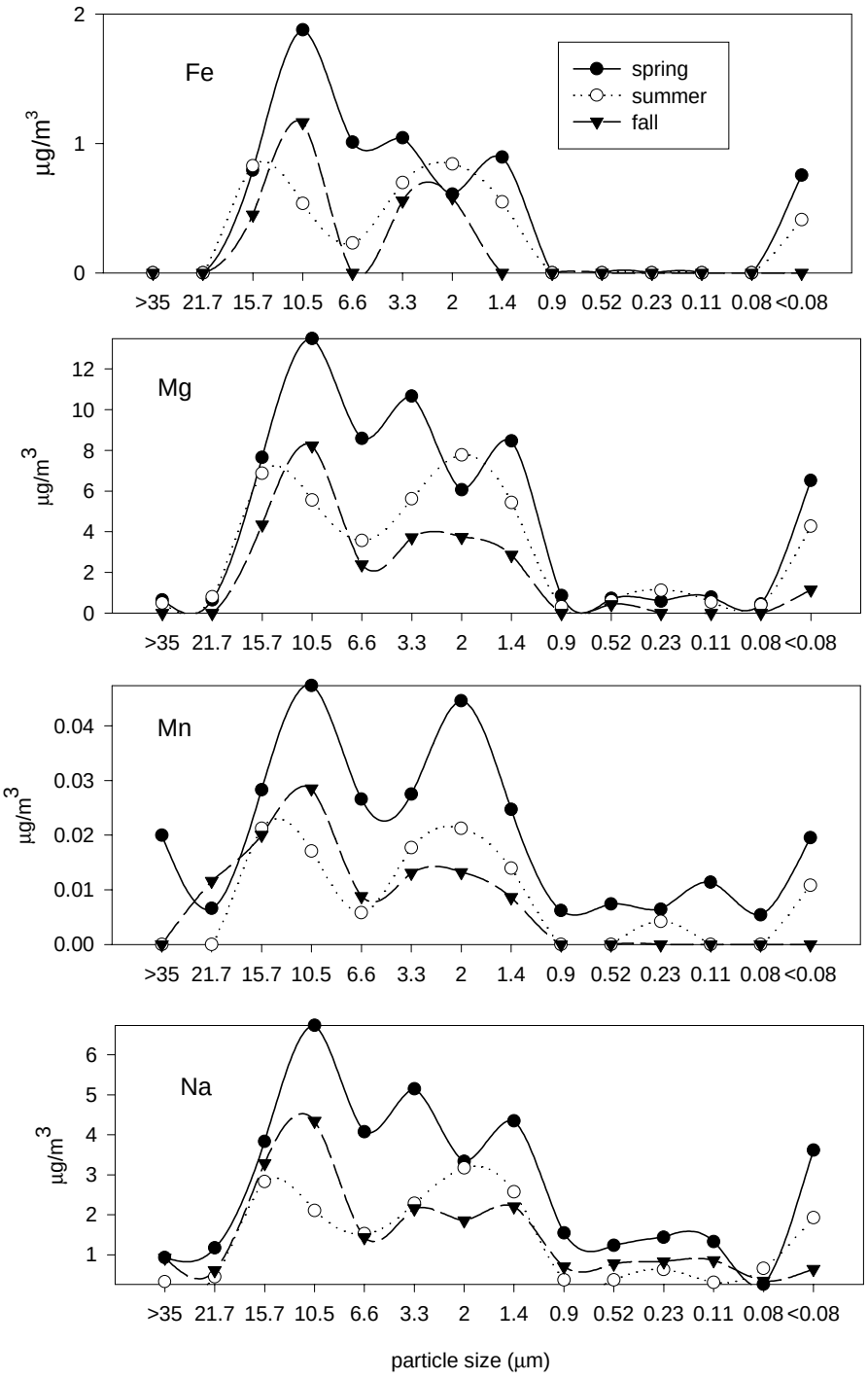

Figure 4 (continued). Size fractionated mean metal concentrations (µg/m^3) by season (spring n=5, summer n=6, fall n=5). Spring: April 11-June 20; Summer: July 4-September 12; Fall: September 12-October 17.

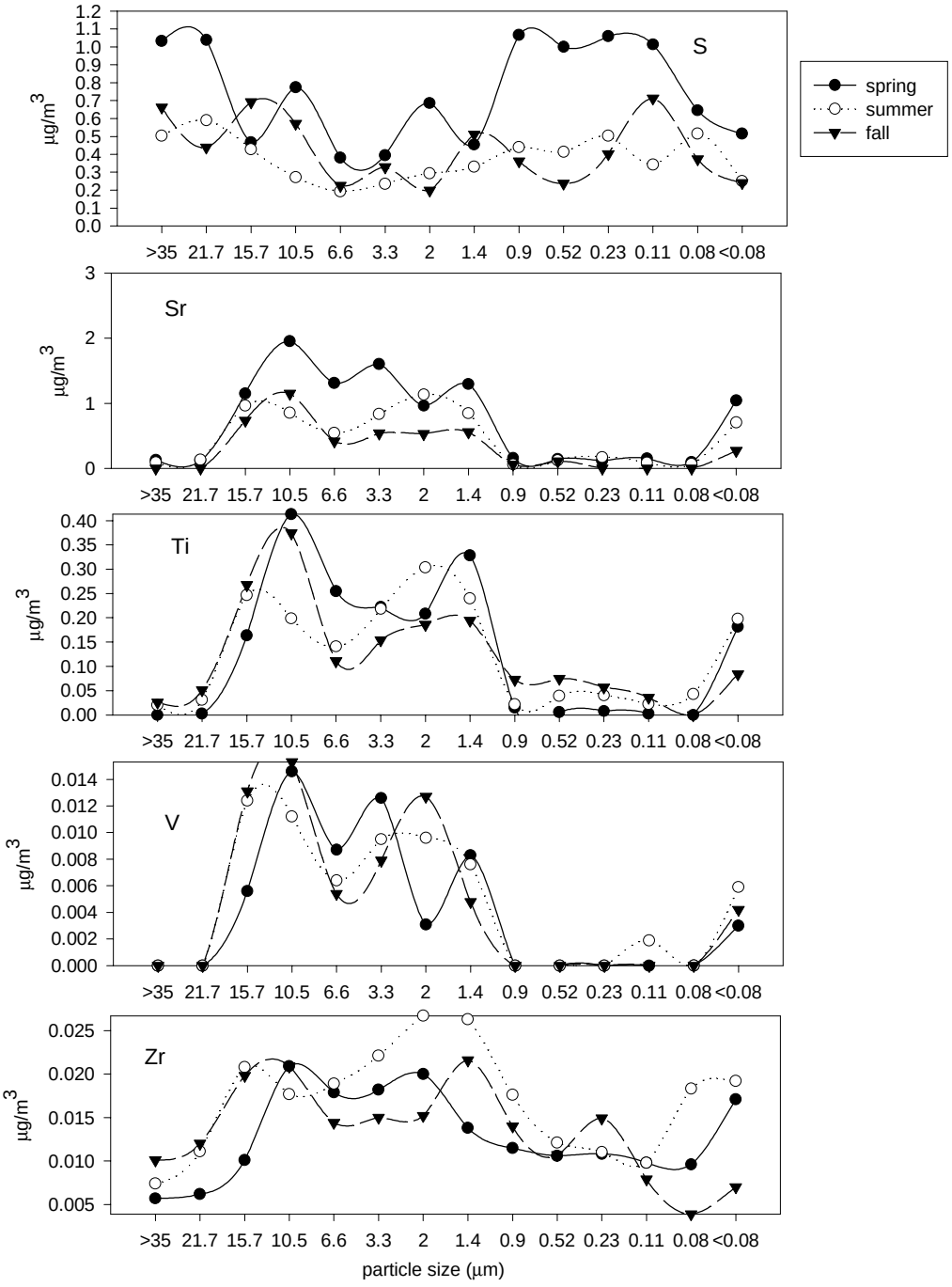

Figure 4 (continued). Size fractionated mean metal concentrations (µg/m^3) by season (spring n=5, summer n=6, fall n=5). Spring: April 11-June 20; Summer: July 4-September 12; Fall: September 12-October 17.

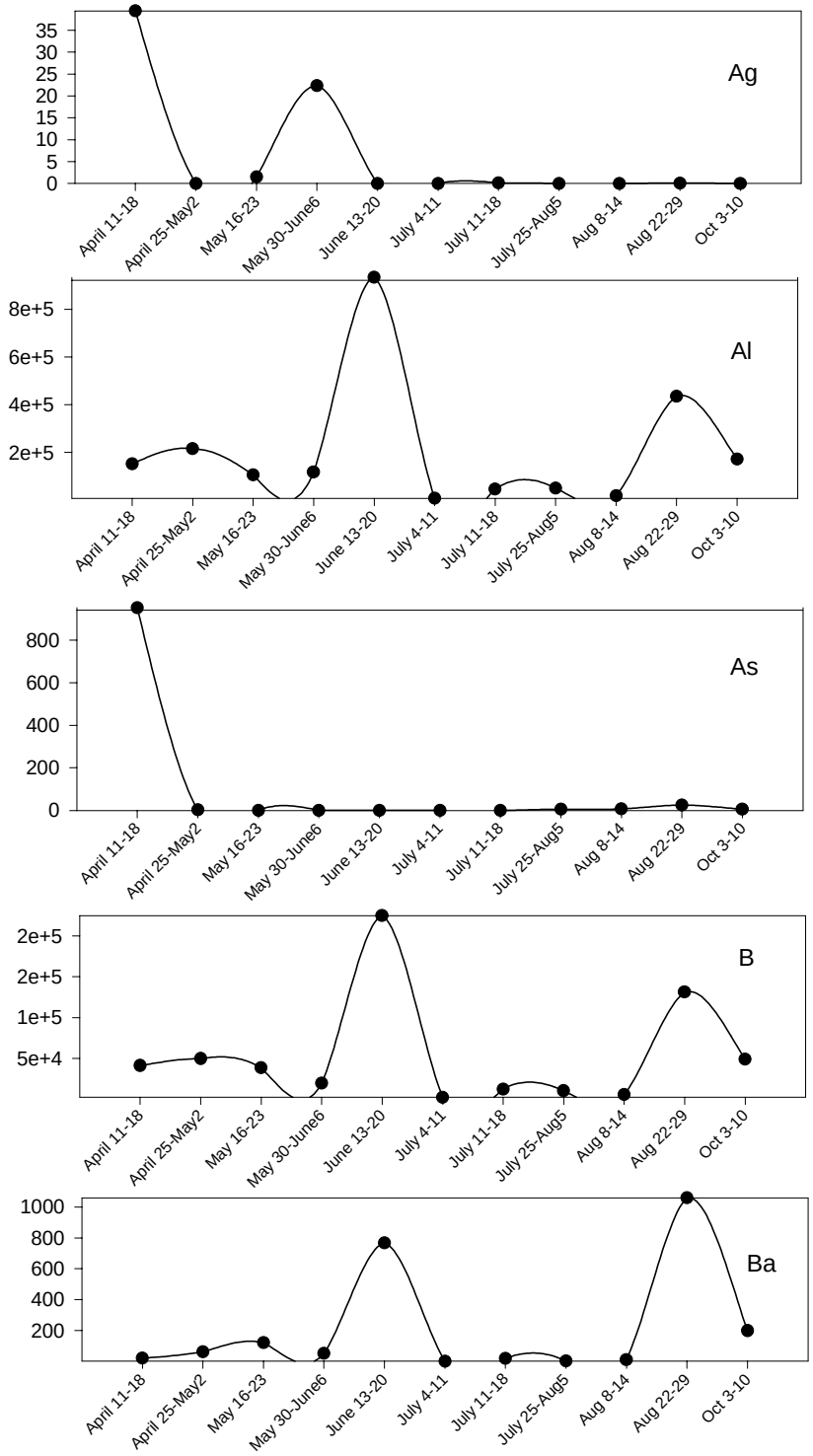

Figure 5. Metal deposition rates (µg/m^2/day) for the sum of particle size fractions.

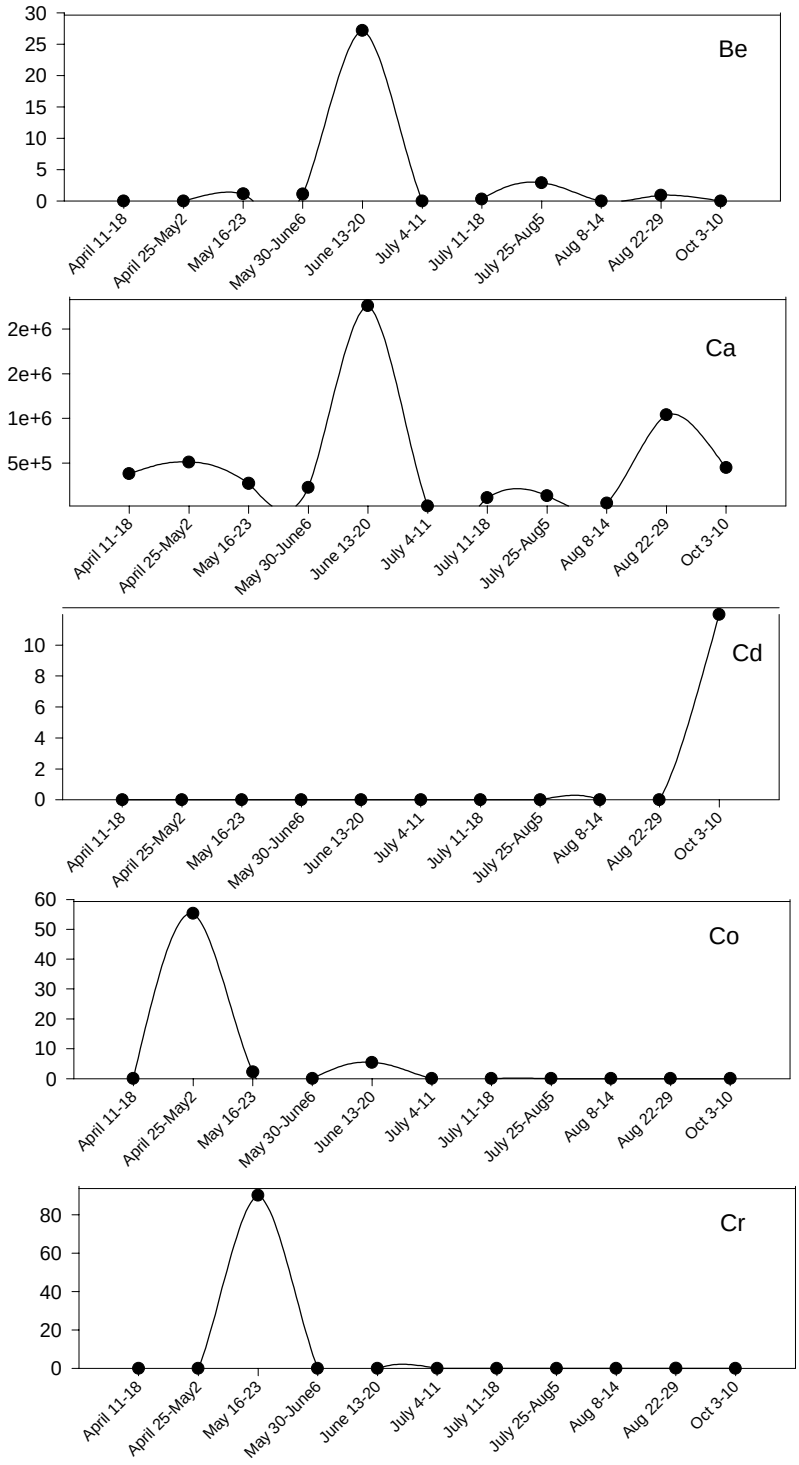

Figure 5 (continued). Metal deposition rates (μg/m^2/day) for the sum of particle size fractions.

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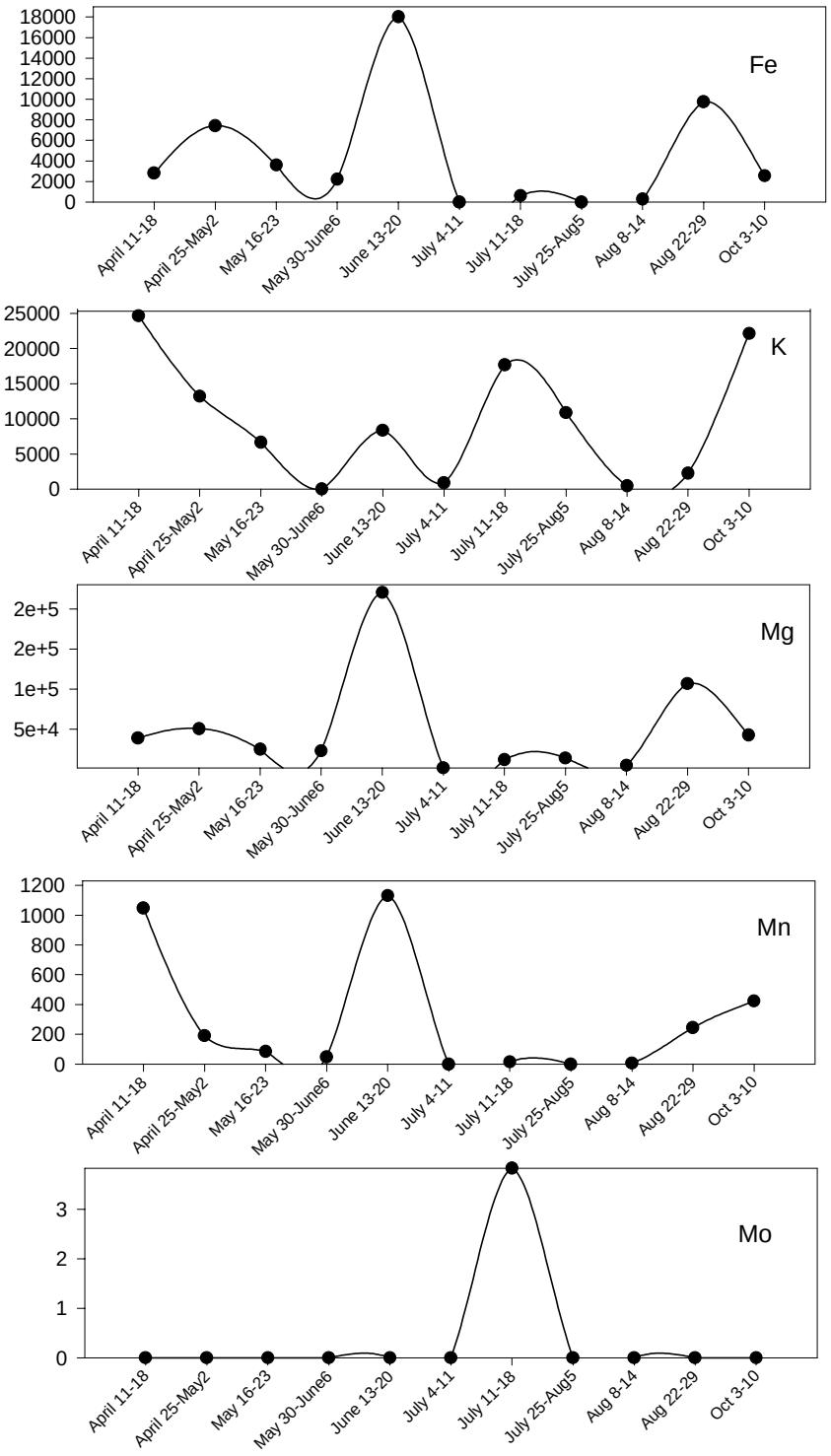

Figure 5 (continued). Metal deposition rates ($\mu g/m^2/day$) for the sum of particle size fractions.

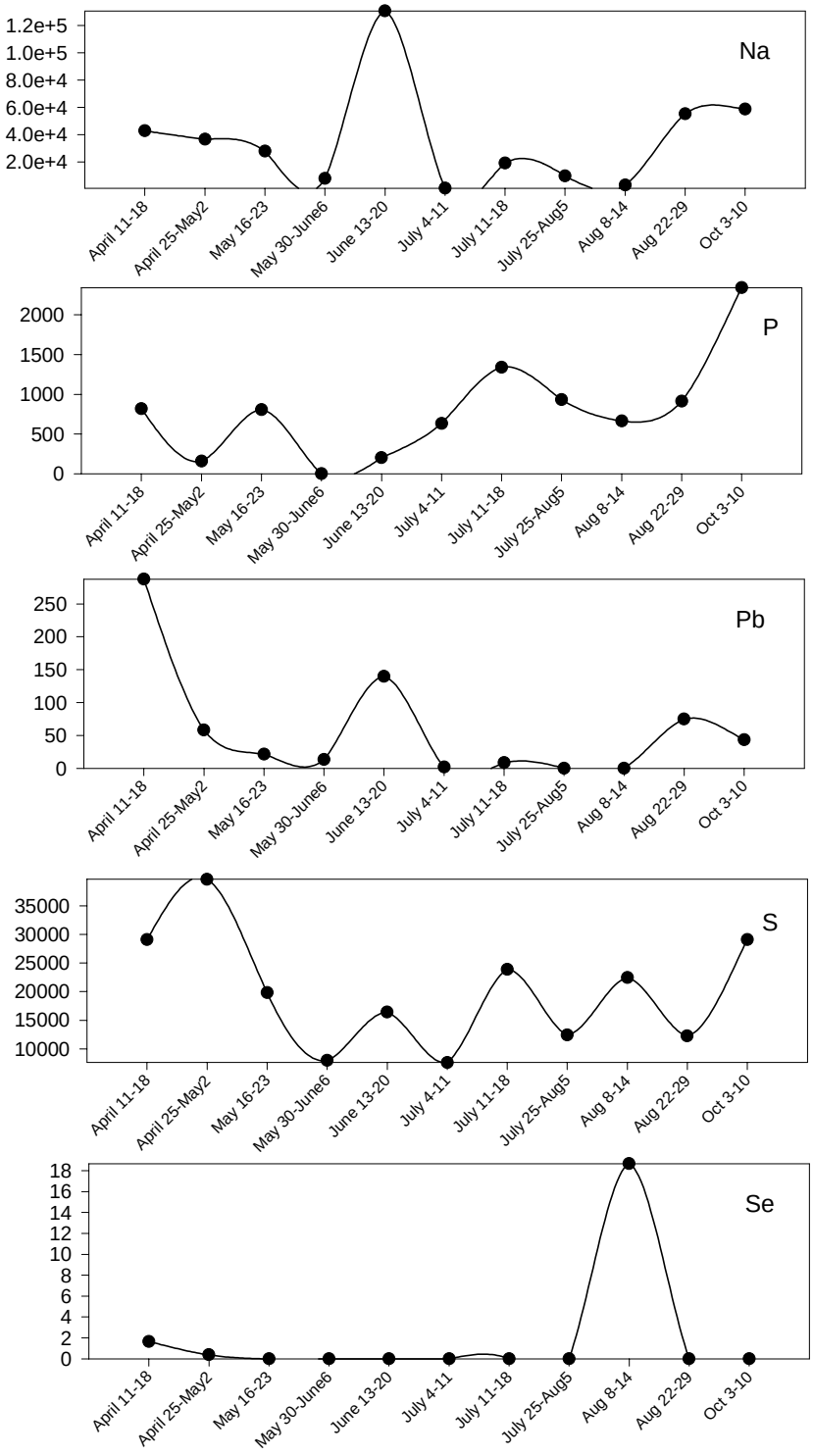

Figure 5 (continued). Metal deposition rates (µg/m^2/day) for the sum of particle size fractions.

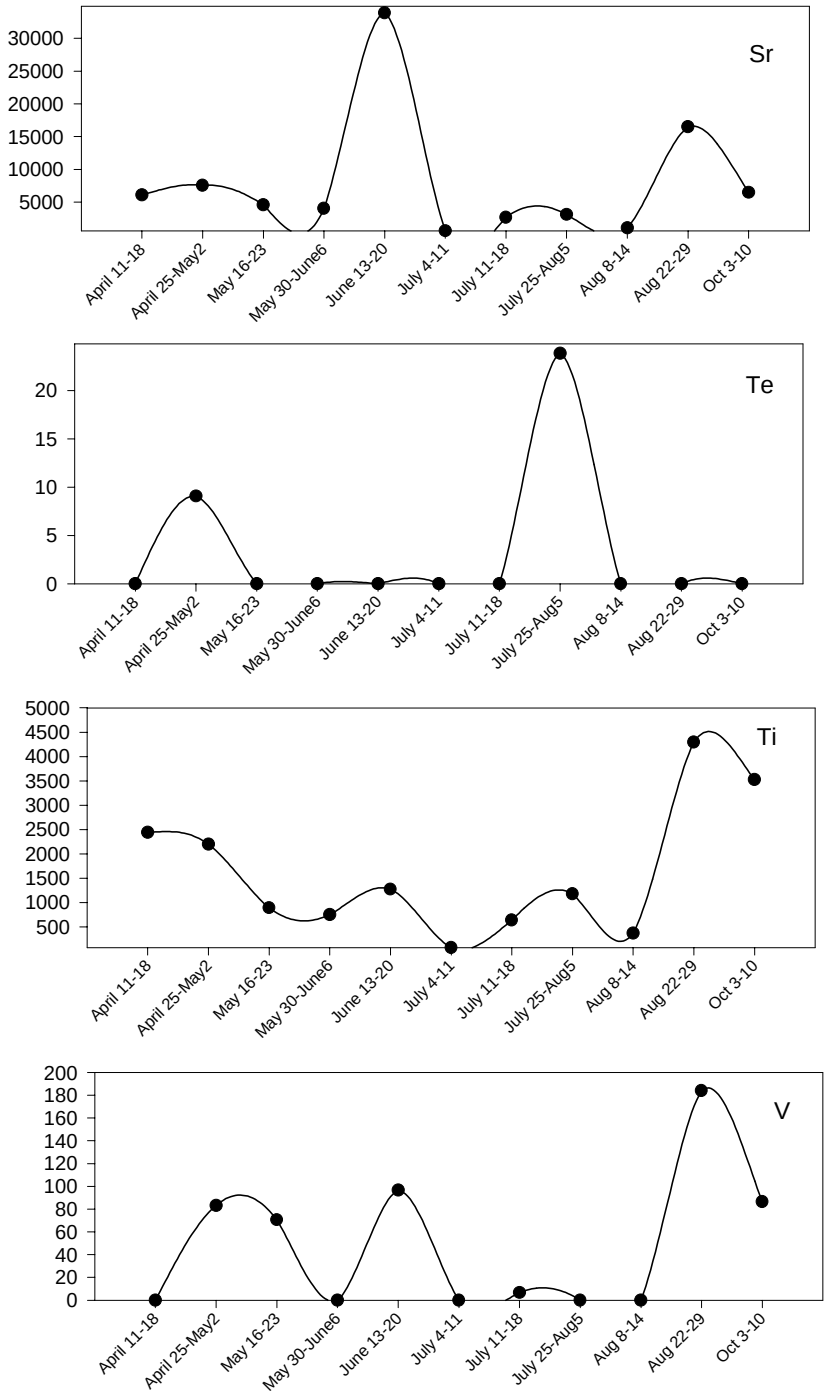

Figure 5 (continued). Metal deposition rates (μg/m^2/day) for the sum of particle size fractions.

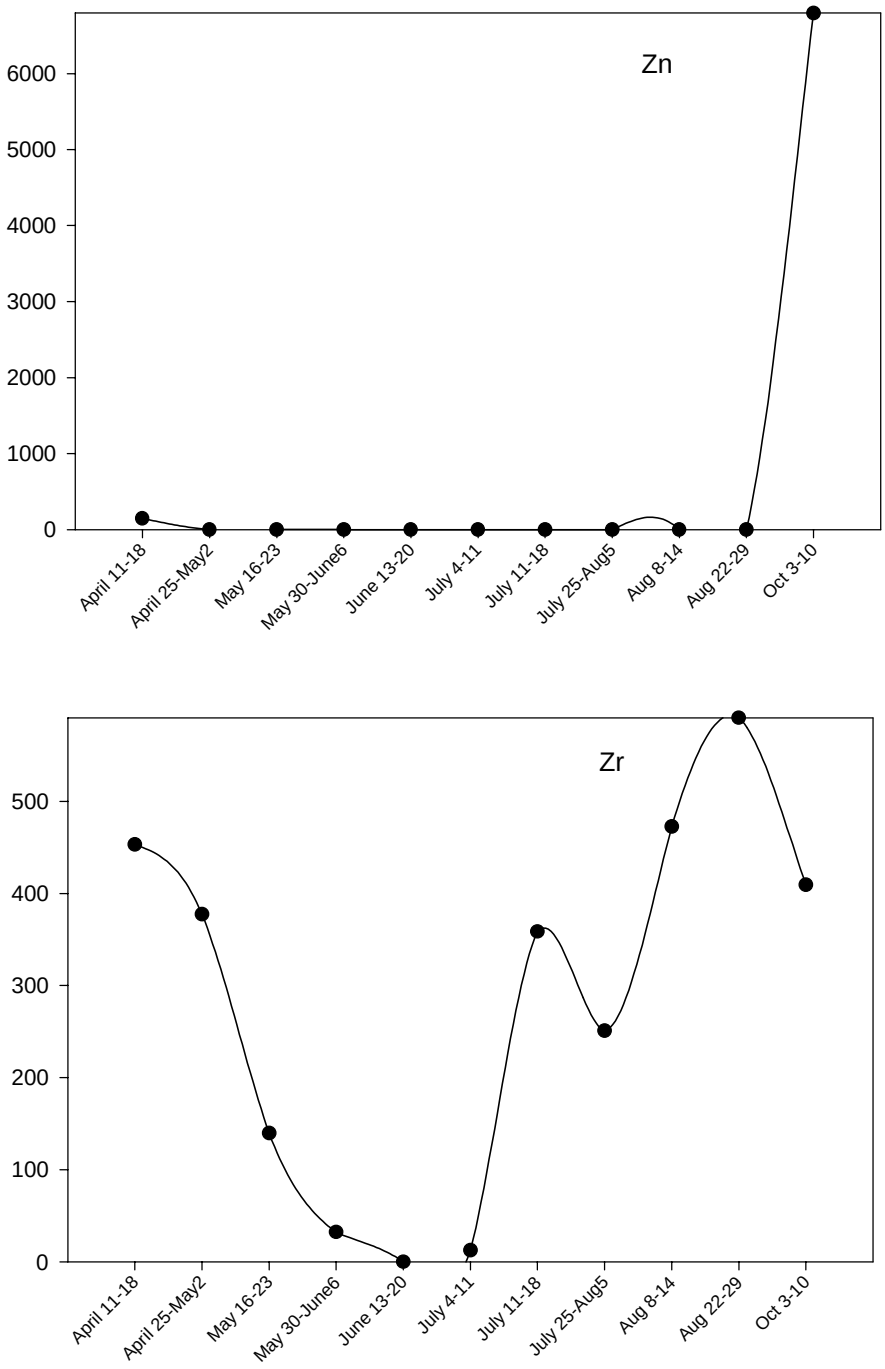

Figure 5 (continued). Metal deposition rates (μg/m^2/day) for the sum of particle size fractions.

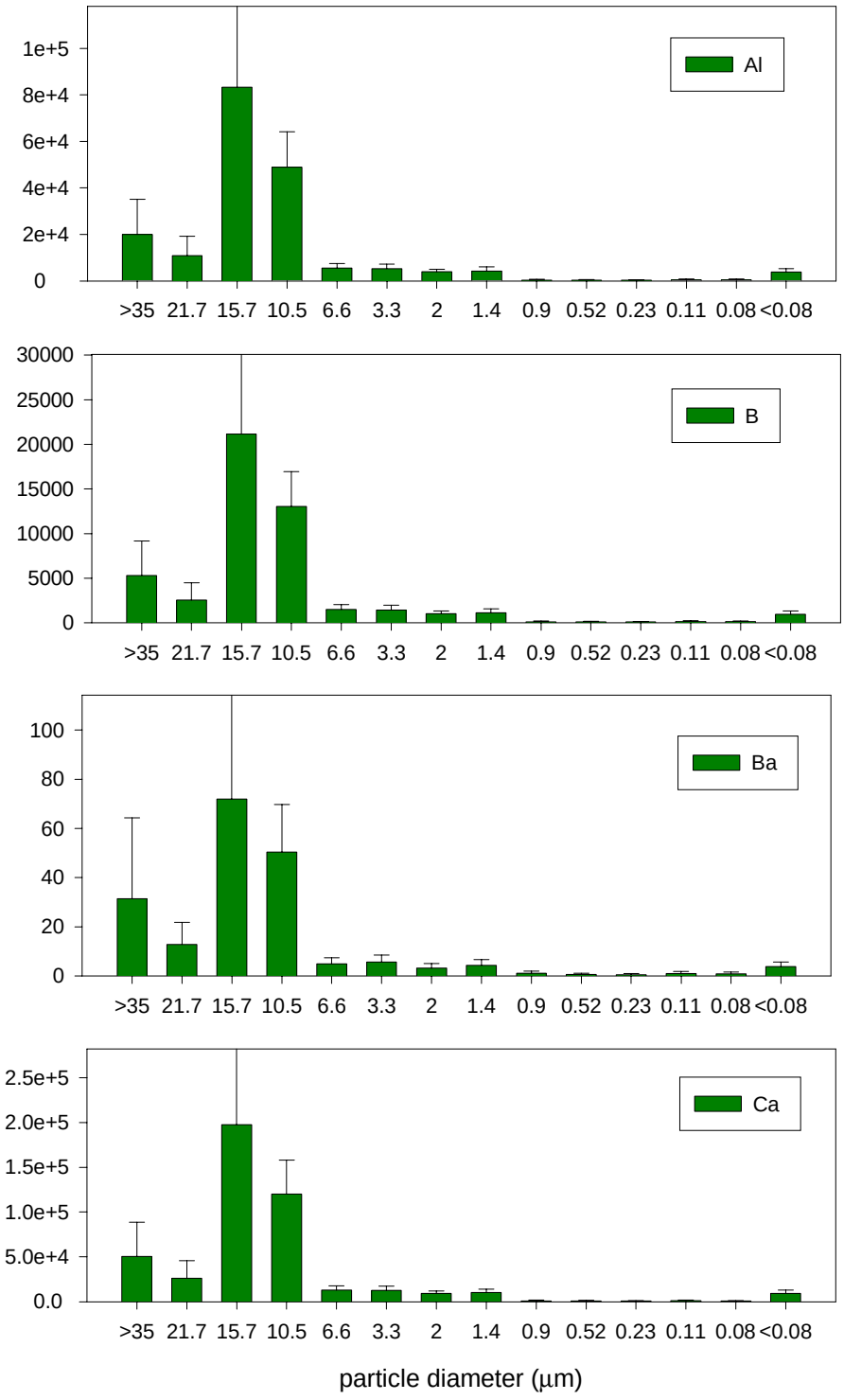

Figure 6. Mean size fractionated metal deposition rates (µg/m^2/day) in LPI samples (n=11)

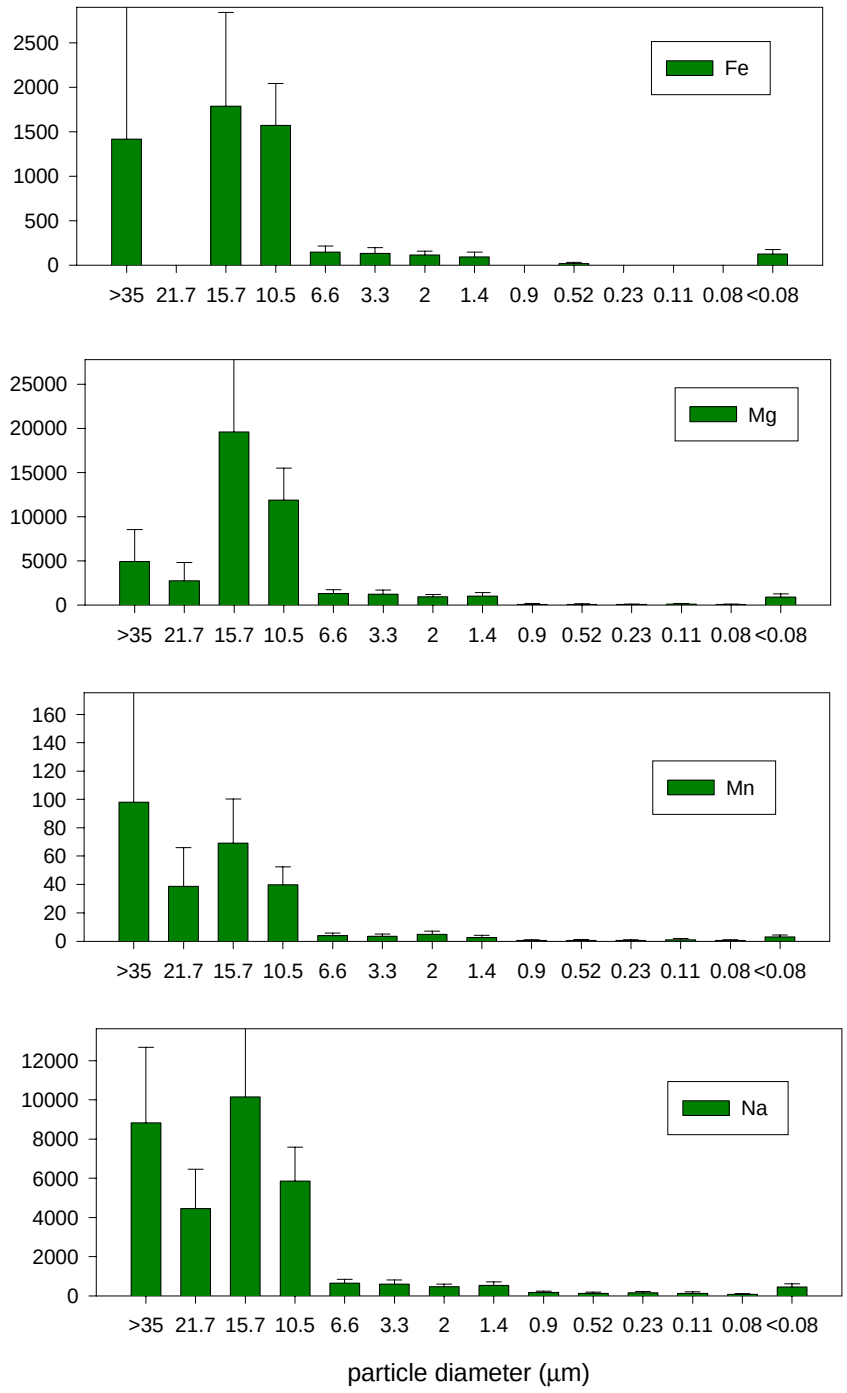

Figure 6 (continued). Mean size fractionated metal deposition rates (µg/m^2/day) in LPI samples (n=11)

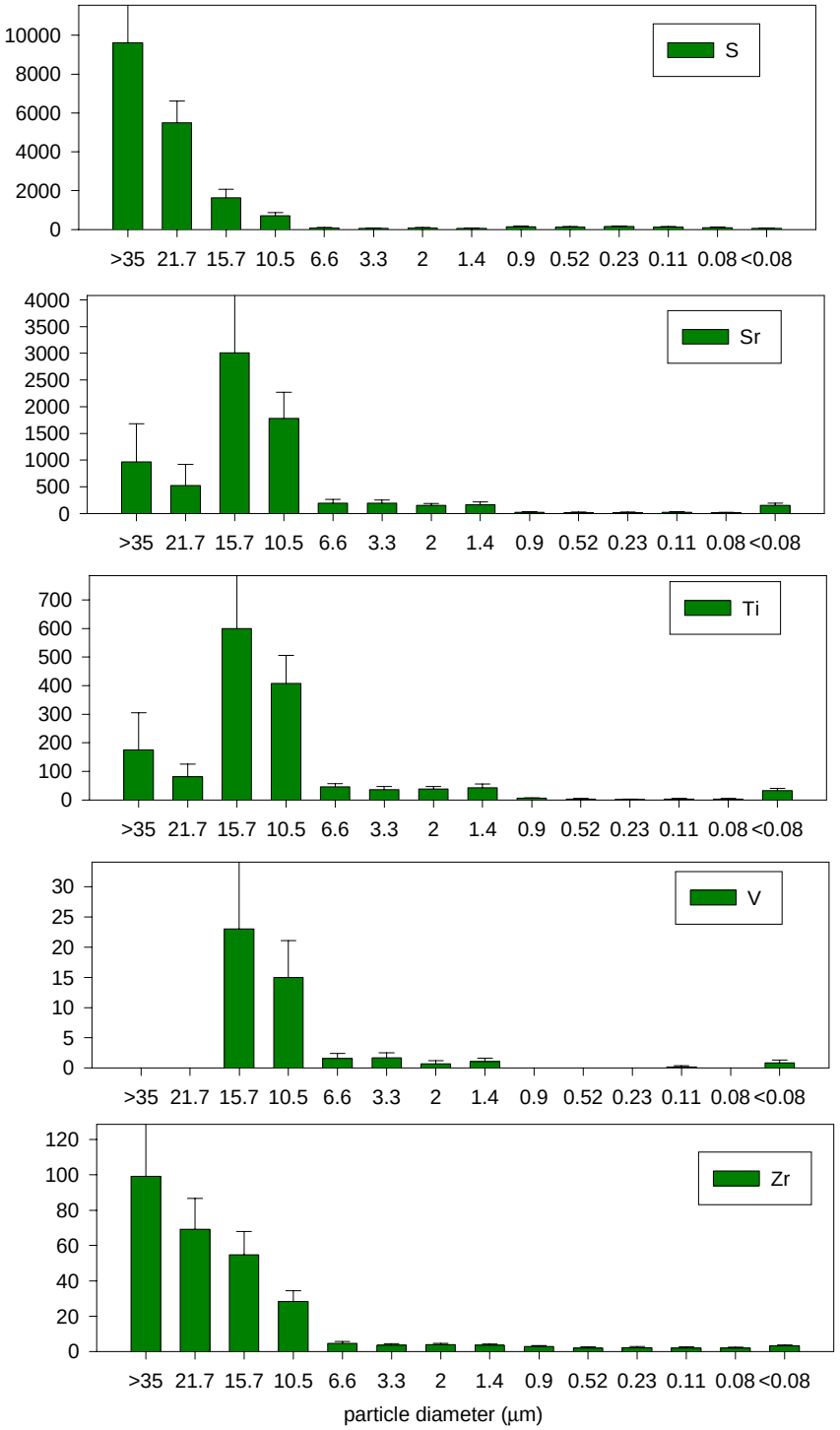

Figure 6 (continued). Mean size fractionated metal deposition rates (µg/m^2/day) in LPI samples (n=11)

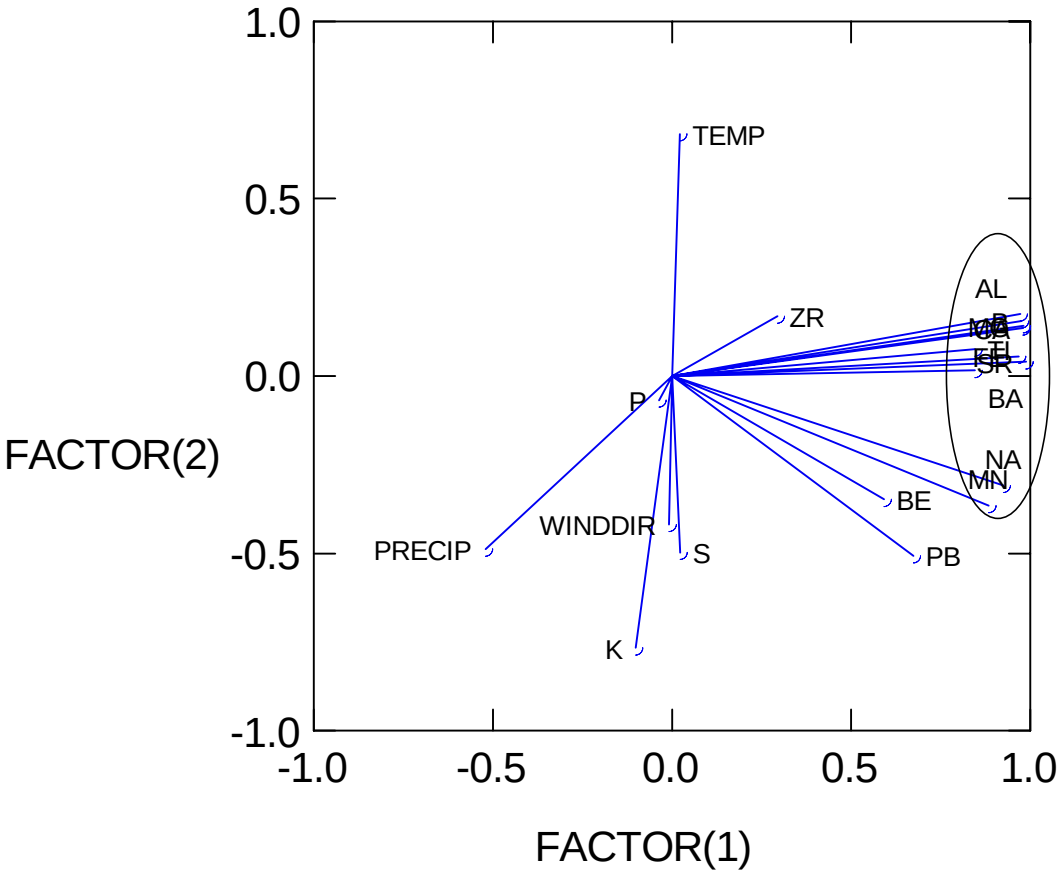

Figure 7. PCA plot of sample metal concentrations for the sum of particle fractions (n=16).

10. APPENDIX A - SIZE FRACTIONATED METAL CONCENTRATIONS

Table A1. Metal Concentrations (µg/m^3) in Size Fractionated LPI Samples at Burnaby Lake (April 11-18, 1995)

Sample:		Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage CO	Stage L2	Stage L3	Stage L4	Stage L5	Stage LF	Stage BU
Particle Diameter (µm):		>35	21.7	15.7	10.5	6.6	3.3	2.0	1.4	0.9	0.52	0.23	0.11	0.08	<0.08
Parameter	MDL														
Ag	0.0003	0.0016	0.0023	0.0006	ND	0.0004	0.0020	0.0011	ND	0.0017	ND	0.0010	ND	0.0021	0.0021
Al	0.1660	ND	ND	21.2717	31.2319	27.9119	16.9557	20.6077	11.3116	ND	ND	ND	ND	ND	1.0194
As	0.0013	0.0498	0.0043	0.0664	0.0279	0.0186	ND	ND	0.0631	0.0056	ND	ND	ND	ND	0.0398
B	0.0996	ND	ND	5.9909	7.9830	6.6549	3.9989	5.6589	3.0029	ND	ND	ND	ND	ND	0.3468
Ba	0.0025	ND	ND	ND	0.0118	0.0052	ND	ND	ND	ND	ND	ND	ND	ND	ND
Be	0.0005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bi	0.0664	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	1.3280	ND	ND	53.7740	77.0144	67.0542	40.4938	50.4540	27.2136	ND	ND	ND	ND	ND	2.9772
Cd	0.1494	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	0.0075	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	1.4940	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	1.2450	ND	ND	ND	1.4276	1.2616	ND	1.2616	ND	ND	ND	ND	ND	ND	ND
K	0.9960	1.7291	ND	0.9323	ND	ND	ND	2.9575	ND	ND	ND	ND	ND	ND	ND
Mg	0.0498	ND	ND	5.5544	7.8785	6.8825	4.2264	5.5544	2.5664	ND	ND	ND	ND	ND	0.2424
Mn	0.0249	0.0730	ND	0.0259	0.0319	0.0292	ND	0.1394	ND	ND	ND	ND	ND	ND	ND
Mo	0.0100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	0.9960	0.5417	1.5378	3.5298	4.8578	3.8618	2.5338	4.8578	2.2018	1.2057	1.2057	1.2057	0.5417	ND	1.2057
Ni	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	0.0996	0.0644	ND	ND	ND	0.0511	ND	ND	0.0478	0.0943	ND	0.0511	ND	0.0577	ND
Pb	1.2450	0.0056	0.0156	0.0173	0.0203	0.0143	0.0242	ND	ND	ND	0.0199	ND	ND	ND	ND
S	0.2490	1.4316	1.0996	0.4024	0.7344	0.5684	0.2032	2.2948	0.6680	1.5312	1.0332	1.0664	1.2324	0.7344	0.2696
Sb	0.3486	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	0.0013	ND	ND	ND	ND	ND	ND	0.0086	ND	ND	ND	ND	ND	ND	ND
Si	0.2656	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sn	0.0747	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr	0.4316	ND	ND	0.8725	1.1713	1.0385	0.7065	0.8393	0.5405	ND	ND	ND	ND	ND	0.2085
Te	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ti	0.1743	ND	0.0123	0.3211	0.4871	0.3875	0.2547	0.3875	0.2215	0.0555	0.0057	0.0123	0.0024	ND	0.0555
Tl	0.0747	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
V	0.0125	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zn	0.4316	ND	ND	ND	ND	ND	ND	0.7636	ND	ND	ND	ND	ND	ND	ND
Zr	0.0149	0.0153	0.0150	0.0203	0.0289	0.0243	0.0180	0.0366	0.0233	0.0246	0.0180	0.0170	0.0190	0.0140	0.0167

Notes:
MDL = Method Detection Limit
ND = Value below the specified detection limit

Table A2. Metal Concentrations (µg/m^3) in Size Fractionated LPI Samples at Burnaby Lake (April 25-May 2, 1995)

Sample:		Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage CO	Stage L2	Stage L3	Stage L4	Stage L5	Stage LF	Stage BU	Total
Particle Diameter (µm):		>35	21.7	15.7	10.5	6.6	3.3	2.0	1.4	0.9	0.52	0.23	0.11	0.08	<0.08	all fractions
Parameter	MDL															
Ag	0.0003	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Al	0.1660	ND	ND	34.2563	50.7144	15.8231	16.1522	24.3813	44.1312	ND	ND	ND	ND	ND	12.2023	197.6608
As	0.0013	ND	ND	ND	ND	0.0013	ND	0.0022	0.0013	0.0036	ND	ND	ND	ND	ND	0.0084
B	0.0996	ND	ND	7.2563	12.1938	5.2813	5.2813	7.2563	12.8521	ND	ND	ND	ND	ND	3.9647	54.0859
Ba	0.0025	ND	ND	0.0051	0.0282	ND	ND	ND	0.0216	ND	ND	ND	ND	ND	ND	0.0549
Be	0.0005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bi	0.0664	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	1.3280	ND	ND	79.6469	122.4382	36.8556	36.8556	56.6054	109.2717	ND	ND	ND	ND	ND	26.9807	468.6542
Cd	0.1494	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	0.0075	ND	0.0082	ND	ND	0.0109	ND	ND	ND	ND	ND	ND	ND	ND	0.0105	0.0296
Cr	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	1.4940	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	1.2450	ND	ND	1.3167	1.7117	ND	ND	ND	1.6129	ND	ND	ND	ND	ND	ND	4.6412
K	0.9960	1.1218	ND	ND	1.0230	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.1448
Mg	0.0498	ND	ND	7.8111	12.4194	3.8611	3.8611	5.5069	10.7735	ND	ND	ND	ND	ND	2.8736	47.1067
Mn	0.0249	ND	ND	0.0319	0.0461	ND	ND	0.0263	0.0395	ND	ND	ND	ND	ND	ND	0.1438
Mo	0.0100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	0.9960	0.8663	0.8663	3.1704	5.4746	2.1829	1.8538	2.8412	4.8162	0.8663	1.1954	0.8663	ND	0.2079	1.8538	27.0613
Ni	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	0.0996	ND	ND	ND	0.0803	0.0572	0.0605	ND	ND	0.0474	ND	ND	ND	ND	0.0803	0.3257
Pb	1.2450	ND	ND	0.0099	0.0148	ND	ND	ND	0.0099	ND	ND	ND	ND	ND	ND	0.0346
S	0.2490	1.9460	1.9131	0.9914	1.2548	0.9585	0.6952	0.7939	0.9585	1.4193	1.6168	1.8143	1.3206	1.2218	0.8268	17.7312
Sb	0.3486	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	0.0013	ND	ND	ND	ND	0.0015	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0015
Si	0.2656	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sn	0.0747	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr	0.4316	ND	ND	1.1942	1.7538	0.7005	0.7005	0.8980	1.5892	ND	ND	ND	ND	ND	0.5688	7.4050
Te	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0527	ND	ND	ND	0.0527
Ti	0.1743	ND	ND	0.3184	0.5817	0.1867	0.1538	0.2854	0.4500	0.0057	0.0221	0.0122	ND	ND	0.1867	2.2027
Tl	0.0747	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
V	0.0125	ND	ND	0.0142	0.0191	ND	ND	0.0155	0.0168	ND	ND	ND	ND	ND	ND	0.0655
Zn	0.4316	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zr	0.0149	0.0132	0.0159	0.0162	0.0297	0.0270	0.0228	0.0330	0.0297	0.0178	0.0182	0.0182	0.0135	0.0201	0.0264	0.3016

Notes:
MDL = Method Detection Limit
ND = Value below the specified detection limit

Table A3. Metal Concentrations (µg/m^3) in Size Fractionated LPI Samples at Burnaby Lake (May 16-23, 1995)

Sample:		Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage CO	Stage L2	Stage L3	Stage L4	Stage L5	Stage LF	Stage BU	Total
Particle Diameter (µm):		>35	21.7	15.7	10.5	6.6	3.3	2.0	1.4	0.9	0.52	0.23	0.11	0.08	<0.08	all fractions
Parameter	MDL															
Ag	0.0003	ND	ND	ND	0.0005	ND	0.0010	0.0005	ND	0.0005	0.0008	ND	0.0010	0.0003	ND	0.0045
Al	0.1660	ND	ND	1.3568	51.3568	44.6902	61.3568	0.3568	0.0235	ND	ND	ND	ND	ND	7.3568	166.4978
As	0.0013	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B	0.0996	ND	ND	0.6816	18.3482	15.3482	22.3482	0.3482	0.0149	ND	ND	ND	ND	ND	2.3482	59.4376
Ba	0.0025	ND	ND	ND	0.0619	0.0419	0.0819	ND	ND	ND	ND	ND	ND	ND	0.0152	0.2008
Be	0.0005	ND	ND	ND	0.0006	0.0005	0.0005	ND	ND	ND	ND	ND	ND	ND	0.0004	0.0019
Bi	0.0664	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	1.3280	ND	ND	3.9891	130.6558	107.3224	160.6558	1.9891	1.6558	ND	ND	ND	ND	ND	20.6558	426.9238
Cd	0.1494	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	0.0075	ND	ND	ND	ND	0.0080	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0080
Cr	0.0498	ND	ND	ND	0.0533	ND	0.0633	ND	ND	ND	ND	ND	ND	ND	ND	0.1167
Cu	1.4940	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	1.2450	ND	ND	ND	1.8667	1.6333	2.2667	ND	ND	ND	ND	ND	ND	ND	ND	5.7667
K	0.9960	ND	ND	1.1027	1.2693	1.0693	1.4360	ND	ND	ND	ND	ND	ND	ND	ND	4.8773
Mg	0.0498	ND	ND	0.2433	12.2433	10.2433	15.2433	0.0433	0.0100	ND	ND	ND	ND	ND	1.5767	39.6033
Mn	0.0249	ND	ND	ND	0.0433	0.0400	0.0533	ND	ND	ND	ND	ND	ND	ND	ND	0.1367
Mo	0.0100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	0.9960	ND	0.2106	2.8772	7.5439	4.2106	7.8772	0.5439	1.8772	0.8772	0.2106	2.2106	2.2106	0.2106	1.8772	32.7374
Ni	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	0.0996	ND	0.0980	ND	0.0880	ND	0.0746	ND	ND	ND	ND	ND	0.0546	ND	0.0713	0.3865
Pb	1.2450	ND	ND	ND	0.0127	ND	0.0150	ND	ND	ND	ND	ND	ND	ND	ND	0.0277
S	0.2490	0.8040	0.9707	0.5373	0.6040	0.2040	0.5707	0.2040	0.3373	1.1707	1.1707	1.5040	1.4707	1.0040	0.7373	11.2892
Sb	0.3486	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	0.0013	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	0.2656	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sn	0.0747	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr	0.4316	ND	ND	0.2427	1.8094	1.5427	2.1760	0.2094	0.2094	ND	ND	ND	ND	ND	0.4427	6.6322
Te	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ti	0.1743	ND	ND	0.0557	0.3224	0.2557	0.4224	0.0557	0.0557	0.0124	ND	0.0024	0.0091	ND	0.1891	1.3806
Tl	0.0747	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
V	0.0125	ND	ND	ND	0.0367	0.0303	0.0467	ND	ND	ND	ND	ND	ND	ND	ND	0.1137
Zn	0.4316	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zr	0.0149	ND	ND	0.0141	0.0301	0.0264	0.0501	0.0171	0.0161	0.0151	0.0171	0.0187	0.0167	0.0137	0.0234	0.2583

Notes:
MDL = Method Detection Limit
ND = Value below the specified detection limit

Table A4. Metal Concentrations (µg/m^3) in Size Fractionated LPI Samples at Burnaby Lake (May 30-June 6, 1995)

Sample:		Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage CO	Stage L2	Stage L3	Stage L4	Stage L5	Stage LF	Stage BU	Total
Particle Diameter (µm):		>35	21.7	15.7	10.5	6.6	3.3	2	1.4	0.9	0.52	0.23	0.11	0.08	<0.08	all fractions
Parameter	MDL															
Ag	0.0003	0.0020	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0020
Al	0.1660	ND	ND	11.2779	34.4490	21.2084	19.2223	24.5185	17.5672	ND	ND	ND	ND	ND	31.1389	159.3822
As	0.0013	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B	0.0996	ND	ND	1.0078	7.2972	4.6490	3.3250	4.6490	3.6560	ND	ND	ND	ND	ND	6.6351	31.2191
Ba	0.0025	ND	ND	ND	0.0283	0.0085	ND	0.0085	ND	ND	ND	ND	ND	ND	0.0217	0.0670
Be	0.0005	ND	ND	ND	0.0005	0.0004	0.0004	0.0004	ND	ND	ND	ND	ND	ND	0.0006	0.0022
Bi	0.0664	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	1.3280	ND	ND	13.8919	80.0951	50.3037	37.0630	50.3037	40.3732	ND	ND	ND	ND	ND	70.1646	342.1951
Cd	0.1494	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	0.0075	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	1.4940	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	1.2450	ND	ND	ND	1.3241	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.2579	2.5819
K	0.9960	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mg	0.0498	ND	ND	1.5657	8.1860	4.8759	3.5518	5.2069	4.2138	ND	ND	ND	ND	ND	6.8620	34.4621
Mn	0.0249	ND	ND	ND	0.0285	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0271	0.0556
Mo	0.0100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	0.9960	ND	ND	ND	3.8503	2.1952	1.2022	2.1952	1.2022	0.5401	ND	ND	ND	ND	3.5193	14.7044
Ni	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	0.0996	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pb	1.2450	ND	ND	ND	0.0076	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0099	0.0175
S	0.2490	0.2688	0.5336	ND	0.5998	0.1695	ND	0.1364	ND	0.7322	0.5336	0.2688	0.2357	0.2688	0.4343	4.1813
Sb	0.3486	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	0.0013	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	0.2656	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sn	0.0747	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr	0.4316	ND	ND	0.3403	1.2672	0.8368	0.6713	0.8368	0.7044	ND	ND	ND	ND	ND	1.0685	5.7254
Te	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ti	0.1743	ND	ND	ND	0.3864	0.1877	0.1215	0.1546	0.1215	ND	ND	ND	ND	ND	0.2870	1.2589
Tl	0.0747	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
V	0.0125	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zn	0.4316	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zr	0.0149	ND	ND	ND	0.0156	0.0116	ND	0.0133	ND	ND	ND	ND	ND	ND	0.0189	0.0595

Notes:
MDL = Method Detection Limit
ND = Value below the specified detection limit

Table A5. Metal Concentrations (µg/m^3) in Size Fractionated LPI Samples at Burnaby Lake (June 13-20, 1995)

Sample:		Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage CO	Stage L2	Stage L3	Stage L4	Stage L5	Stage LF	Stage BU	Total
Particle Diameter (µm):		>35	21.7	15.7	10.5	6.6	3.3	2	1.4	0.9	0.52	0.23	0.11	0.08	<0.08	all fractions
Parameter	MDL															
Ag	0.0003	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Al	0.1660	13.7867	13.1153	98.7145	112.1418	75.2167	112.1418	58.4325	105.4282	17.1435	15.8008	11.7726	17.1435	19.4933	88.6440	758.9751
As	0.0013	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B	0.0996	3.3718	3.0362	24.1842	26.1983	17.1348	26.5340	14.4494	25.5269	4.7146	4.0432	3.0362	4.3789	5.0503	21.1630	182.8217
Ba	0.0025	ND	0.0120	0.0959	0.1261	0.0724	0.1294	0.0522	0.1227	0.0086	0.0086	ND	0.0052	ND	0.0925	0.7257
Be	0.0005	0.0009	0.0008	0.0015	0.0015	0.0015	0.0019	0.0014	0.0017	0.0032	0.0016	0.0031	0.0017	ND	0.0009	0.0216
Bi	0.0664	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	1.3280	34.2287	30.8719	238.9954	279.2774	171.8588	262.4932	138.2905	245.7091	40.9424	37.5855	27.5150	40.9424	20.8014	215.4976	1785.0093
Cd	0.1494	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	0.0075	ND	ND	ND	ND	0.0094	0.0144	ND	ND	ND	ND	ND	ND	ND	ND	0.0238
Cr	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	1.4940	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	1.2450	ND	ND	2.6519	3.0547	2.1484	2.9540	1.7791	2.8533	ND	ND	ND	ND	ND	2.5176	17.9590
K	0.9960	ND	ND	1.1776	1.7818	ND	1.9496	ND	1.2111	ND	ND	ND	ND	ND	1.1440	7.2641
Mg	0.0498	3.2662	3.2662	23.0715	26.7640	17.0292	26.4283	14.0081	24.7499	4.2732	3.6019	2.9305	3.9376	2.2591	21.0574	176.6432
Mn	0.0249	0.0272	0.0329	0.0839	0.0873	0.0638	0.0839	0.0571	0.0839	0.0309	0.0369	0.0319	0.0571	0.0269	0.0705	0.7741
Mo	0.0100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	0.9960	3.2332	3.2332	9.6112	11.9610	7.9328	12.2966	6.2544	11.6253	4.2403	3.5689	2.8975	3.9046	0.8834	9.6112	91.2534
Ni	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	0.0996	ND	ND	ND	0.1087	ND	0.0852	ND	0.0752	ND	ND	ND	ND	ND	ND	0.2691
Pb	1.2450	ND	ND	0.0201	0.0252	0.0151	0.0228	0.0151	0.0201	ND	ND	ND	ND	ND	0.0201	0.1386
S	0.2490	0.7090	0.6754	0.4068	0.6754	0.0040	0.5075	ND	0.3061	0.4740	0.6418	0.6418	0.8097	ND	0.3061	6.1576
Sb	0.3486	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	0.0013	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	0.2656	0.5707	ND	ND	0.3693	ND	ND	ND	0.3693	ND	ND	ND	ND	ND	ND	1.3092
Sn	0.0747	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr	0.4316	0.6472	0.6137	3.0977	3.7691	2.4263	3.7691	2.0235	3.4334	0.7815	0.7144	0.5801	0.7479	0.4794	2.9299	26.0131
Te	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ti	0.1743	ND	ND	0.1233	0.2911	0.2575	0.1568	0.1568	0.7946	ND	ND	0.0125	ND	ND	0.1904	1.9830
Tl	0.0747	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
V	0.0125	ND	ND	0.0138	0.0171	0.0131	0.0164	ND	0.0245	ND	ND	ND	ND	ND	0.0148	0.0997
Zn	0.4316	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zr	0.0149	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes:
MDL = Method Detection Limit
ND = Value below the specified detection limit

Table A6. Metal Concentrations (µg/m^3) in Size Fractionated LPI Samples at Burnaby Lake (July 4-11, 1995)

Sample:		Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage CO	Stage L2	Stage L3	Stage L4	Stage L5	Stage LF	Stage BU	Total
Particle Diameter (		>35	21.7	15.7	10.5	6.6	3.3	2	1.4	0.9	0.52	0.23	0.11	0.08	<0.08	all fractions
Parameter	MDL															
Ag	0.0003	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Al	0.1660	ND	ND	ND	2.3474	ND	2.3474	3.3435	5.9995	ND	ND	ND	ND	ND	17.6197	31.6575
As	0.0013	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B	0.0996	ND	ND	ND	0.6789	ND	1.0109	1.3429	2.0069	ND	ND	ND	ND	ND	3.6669	8.7063
Ba	0.0025	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0052	0.0052
Be	0.0005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bi	0.0664	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	1.3280	ND	ND	ND	3.9732	ND	7.2933	7.2933	13.9334	ND	ND	ND	ND	ND	40.4938	72.9869
Cd	0.1494	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	0.0075	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	1.4940	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	1.2450	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
K	0.9960	ND	ND	ND	ND	ND	1.0319	ND	1.0983	ND	ND	0.9655	ND	1.0983	1.0983	5.2921
Mg	0.0498	ND	ND	ND	0.5744	ND	0.9064	0.9064	1.5704	ND	ND	ND	ND	ND	4.2264	8.1839
Mn	0.0249	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mo	0.0100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	0.9960	ND	ND	ND	ND	ND	0.5417	0.2097	0.8737	ND	ND	ND	ND	1.2057	2.2018	5.0327
Ni	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	0.0996	0.0478	ND	ND	0.0577	0.0511	0.0710	0.1075	0.0644	ND	ND	0.0611	ND	ND	0.0544	0.5150
Pb	1.2450	ND	ND	ND	ND	ND	ND	ND	0.0050	ND	ND	ND	ND	ND	0.0050	0.0100
S	0.2490	0.6348	0.0704	0.0704	0.1036	ND	0.0704	ND	0.1036	0.3028	0.2364	0.2364	0.3028	1.0664	0.1036	3.3013
Sb	0.3486	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	0.0013	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	0.2656	4.6481	4.9801	4.9801	4.9801	4.9801	3.6521	3.9841	3.6521	4.9801	4.9801	4.9801	4.9801	4.6481	4.9801	65.4050
Sn	0.0747	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr	0.4316	ND	ND	ND	0.2417	ND	0.2749	0.2749	0.3745	ND	ND	ND	ND	ND	0.7397	1.9058
Te	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ti	0.1743	ND	ND	ND	0.0090	ND	0.0555	0.0555	0.0555	ND	ND	ND	ND	0.0223	0.1883	0.3861
Tl	0.0747	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
V	0.0125	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zn	0.4316	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zr	0.0149	ND	ND	ND	ND	ND	0.0153	0.0143	0.0147	ND	ND	ND	ND	0.0163	0.0143	0.0750

Notes:
MDL = Method Detection Limit
ND = Value below the specified detection limit

Table A7. Metal Concentrations (µg/m^3) in Size Fractionated LPI Samples at Burnaby Lake (July 11-18, 1995)

Sample:		Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage CO	Stage L2	Stage L3	Stage L4	Stage L5	Stage LF	Stage BU	Total
Particle Diameter (µm):		>35	21.7	15.7	10.5	6.6	3.3	2.0	1.4	0.9	0.52	0.23	0.11	0.08	<0.08	all fractions
Parameter	MDL															
Ag	0.0003	ND	ND	ND	ND	ND	ND	ND	0.0005	ND	ND	ND	ND	ND	ND	0.0005
Al	0.1660	ND	ND	5.9896	0.3548	0.0234	37.8092	13.2816	1.3492	ND	ND	ND	ND	ND	37.8092	96.6170
As	0.0013	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B	0.0996	ND	ND	1.6721	0.0148	0.0148	10.2899	3.3294	0.3463	ND	ND	ND	ND	ND	9.6270	25.2943
Ba	0.0025	ND	ND	ND	ND	ND	0.0516	ND	ND	ND	ND	ND	ND	ND	0.0350	0.0866
Be	0.0005	ND	ND	ND	ND	ND	0.0004	0.0004	ND	ND	ND	ND	ND	ND	0.0005	0.0014
Bi	0.0664	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	1.3280	ND	ND	13.9103	1.3150	ND	93.4595	30.4830	2.6408	ND	ND	ND	ND	ND	90.1450	231.9536
Cd	0.1494	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	0.0075	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	1.4940	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	1.2450	ND	ND	ND	ND	ND	1.5247	ND	ND	ND	ND	ND	ND	ND	1.4253	2.9500
K	0.9960	1.3285	ND	ND	ND	ND	ND	0.9970	ND	ND	0.9307	ND	ND	ND	1.1959	4.4521
Mg	0.0498	ND	ND	1.5678	0.2088	0.0762	8.8598	3.2251	0.2420	ND	ND	ND	ND	ND	8.8598	23.0394
Mn	0.0249	ND	ND	ND	ND	ND	0.0365	ND	ND	ND	ND	ND	ND	ND	0.0365	0.0729
Mo	0.0100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0182	0.0182
Na	0.9960	0.5408	0.8723	0.5408	ND	ND	5.1812	1.2037	0.5408	1.2037	1.5352	0.8723	ND	0.8723	4.5183	17.8816
Ni	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	0.0996	0.0643	ND	0.0842	ND	0.0576	0.1173	ND	ND	0.1040	0.0941	0.0676	0.0477	0.1040	0.0808	0.8216
Pb	1.2450	ND	ND	ND	ND	ND	0.0099	0.0050	ND	0.0025	0.0025	0.0076	ND	ND	0.0126	0.0401
S	0.2490	0.9652	1.1972	0.2691	ND	ND	1.0646	ND	ND	1.1641	1.5949	1.0646	ND	0.9320	0.4349	8.6867
Sb	0.3486	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	0.0013	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	0.2656	4.9718	4.9718	4.6404	4.9718	4.9718	4.6404	4.9718	4.9718	4.6404	4.9718	4.9718	5.3033	4.9718	4.9718	68.9427
Sn	0.0747	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr	0.4316	ND	ND	0.3739	0.1750	ND	1.3683	0.5728	0.2082	ND	ND	ND	ND	ND	1.3020	4.0001
Te	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ti	0.1743	ND	0.0189	0.0554	ND	ND	0.5526	0.0886	ND	0.0223	0.0886	ND	ND	ND	0.4532	1.2795
Tl	0.0747	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
V	0.0125	ND	ND	ND	ND	ND	0.0156	ND	ND	ND	ND	ND	ND	ND	0.0159	0.0315
Zn	0.4316	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zr	0.0149	0.0130	0.0130	0.0130	ND	ND	0.0365	0.0146	0.0173	0.0229	0.0299	0.0176	ND	0.0133	0.0252	0.2164

Notes:
MDL = Method Detection Limit
ND = Value below the specified detection limit

Table A8. Metal Concentrations (µg/m^3) in Size Fractionated LPI Samples at Burnaby Lake (July 25-August 1, 1995)

Sample:		Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage CO	Stage L2	Stage L3	Stage L4	Stage L5	Stage LF	Stage BU	Total
Particle Diameter (		>35	21.7	15.7	10.5	6.6	3.3	2	1.4	0.9	0.52	0.23	0.11	0.08	<0.08	all fractions
Parameter	MDL															
Ag	0.0003	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Al	0.1660	ND	ND	6.8523	5.5531	12.7483	5.6531	10.6830	9.0508	ND	ND	ND	ND	ND	3.8876	54.4282
As	0.0013	ND	ND	ND	0.0022	ND	ND	ND	0.0015	ND	0.0017	ND	ND	0.0020	0.0022	0.0097
B	0.0996	ND	ND	1.2474	1.2807	2.9796	1.6471	2.0469	1.8137	ND	ND	ND	ND	ND	1.1475	12.1629
Ba	0.0025	ND	ND	ND	ND	0.0022	ND	0.0049	0.0029	ND	ND	ND	ND	ND	ND	0.0099
Be	0.0005	ND	ND	0.0004	0.0004	0.0004	0.0004	0.0004	0.0006	0.0004	ND	ND	ND	0.0004	0.0005	0.0037
Bi	0.0664	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	1.3280	ND	ND	17.9771	14.3129	31.3016	14.6460	27.6374	23.3069	ND	ND	ND	ND	ND	10.3156	139.4974
Cd	0.1494	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	0.0075	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	1.4940	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	1.2450	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
K	0.9960	ND	1.2918	ND	ND	1.1152	1.1486	ND	1.3884	ND	ND	ND	ND	ND	0.9520	5.8960
Mg	0.0498	ND	ND	1.9420	1.5423	3.3411	1.5090	2.8748	2.4750	ND	ND	ND	ND	ND	1.1093	14.7935
Mn	0.0249	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mo	0.0100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	0.9960	ND	0.0439	1.4429	0.7767	1.6095	0.8767	1.9426	1.6095	ND	ND	ND	ND	ND	0.7101	9.0119
Ni	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	0.0996	ND	0.0556	0.0746	0.0609	ND	0.0516	0.0672	0.0779	0.0672	ND	ND	ND	ND	0.0889	0.5440
Pb	1.2450	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
S	0.2490	0.2472	0.8634	0.3837	0.1172	0.2172	0.1639	0.4270	0.3471	0.7035	0.4004	0.5170	0.5569	0.0606	0.1639	5.1690
Sb	0.3486	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	0.0013	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	0.2656	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sn	0.0747	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr	0.4316	ND	ND	0.4257	0.3724	0.6023	0.3791	0.5590	0.4957	ND	ND	ND	ND	ND	0.3158	3.1501
Te	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0516	0.0613	ND	ND	0.1129
Ti	0.1743	ND	ND	0.1756	0.1090	0.2122	0.1290	0.2556	0.2256	ND	ND	ND	ND	ND	0.0857	1.1926
Tl	0.0747	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
V	0.0125	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zn	0.4316	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zr	0.0149	ND	0.0163	0.0151	0.0165	0.0176	0.0219	0.0233	0.0238	0.0191	ND	ND	0.0146	ND	0.0205	0.1887

Notes:
MDL = Method Detection Limit
ND = Value below the specified detection limit

Table A9. Metal Concentrations (μg/m^3) in Size Fractionated LPI Samples at Burnaby Lake (August 8-14, 1995)

Sample:		Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage CO	Stage L2	Stage L3	Stage L4	Stage L5	Stage LF	Stage BU	Total
Particle Diameter (μm):		>35	21.7	15.7	10.5	6.6	3.3	2	1.4	0.9	0.52	0.23	0.11	0.08	<0.08	all fractions
Parameter	MDL															
Ag	0.0003	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Al	0.1660	ND	ND	ND	5.3143	ND	ND	29.4545	15.0696	ND	ND	ND	ND	ND	1.4453	51.2837
As	0.0013	ND	ND	ND	0.0035	ND	ND	ND	0.0015	ND	0.0030	ND	ND	ND	ND	0.0079
B	0.0996	ND	ND	ND	1.8666	ND	ND	7.0915	4.0492	ND	ND	ND	ND	ND	0.0478	13.0552
Ba	0.0025	ND	ND	ND	ND	ND	ND	0.0290	0.0234	ND	ND	ND	ND	ND	ND	0.0523
Be	0.0005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bi	0.0664	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	1.3280	ND	ND	ND	13.8781	ND	ND	77.7008	38.0183	ND	ND	ND	ND	ND	4.9495	134.5467
Cd	0.1494	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	0.0075	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	1.4940	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	1.2450	ND	ND	ND	ND	ND	ND	1.2996	ND	ND	ND	ND	ND	ND	ND	1.2996
K	0.9960	ND	ND	ND	ND	ND	ND	1.1038	0.9153	ND	ND	ND	ND	ND	ND	2.0192
Mg	0.0498	ND	ND	ND	1.4649	ND	ND	7.6157	3.8459	ND	ND	ND	ND	ND	0.5390	13.4656
Mn	0.0249	ND	ND	ND	ND	ND	ND	0.0315	ND	ND	ND	ND	ND	ND	ND	0.0315
Mo	0.0100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	0.9960	ND	0.0436	ND	0.6388	0.5065	ND	4.0779	2.4576	ND	ND	0.2750	ND	ND	0.1428	8.1422
Ni	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	0.0996	ND	0.0780	ND	ND	0.0737	ND	0.0678	ND	0.0628	ND	0.0549	0.0691	ND	ND	0.4062
Pb	1.2450	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
S	0.2490	0.8208	1.3267	0.0205	0.2454	0.5198	0.0205	0.4868	0.7182	0.6753	0.6025	1.2275	1.1151	0.7182	0.2222	8.7194
Sb	0.3486	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	0.0013	ND	0.0022	ND	ND	ND	ND	ND	ND	ND	ND	0.0017	0.0015	0.0022	0.0032	0.0109
Si	0.2656	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.5192	ND	0.5192
Sn	0.0747	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr	0.4316	ND	ND	ND	0.3631	ND	ND	1.1336	0.6971	ND	ND	ND	ND	ND	0.2408	2.4346
Te	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ti	0.1743	ND	ND	ND	0.0950	0.1148	0.0116	0.4323	0.3198	ND	ND	ND	ND	ND	0.0619	1.0354
Tl	0.0747	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
V	0.0125	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zn	0.4316	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zr	0.0149	0.0139	0.0208	0.0117	0.0217	0.0282	0.0137	0.0289	0.0384	0.0201	0.0157	0.0221	0.0213	0.0174	0.0161	0.2900

Notes:
MDL = Method Detection Limit
ND = Value below the specified detection limit

Table A10. Metal Concentrations (µg/m^3) in Size Fractionated LPI Samples at Burnaby Lake (August 22-29, 1995)

Sample:		Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage CO	Stage L2	Stage L3	Stage L4	Stage L5	Stage LF	Stage BU	Total
Particle Diameter (µm):		>35	21.7	15.7	10.5	6.6	3.3	2	1.4	0.9	0.52	0.23	0.11	0.08	<0.08	all fractions
Parameter	MDL															
Ag	0.0003	ND	ND	ND	ND	0.0002	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0002
Al	0.1660	8.0286	7.0031	55.9281	57.2512	49.3121	68.4983	66.8444	61.2208	8.2602	4.9191	8.0948	14.9423	10.4765	44.3501	465.1297
As	0.0013	0.0012	ND	0.0020	0.0025	0.0022	0.0025	0.0022	0.0025	0.0012	0.0012	0.0015	0.0012	0.0020	0.0022	0.0246
B	0.0996	2.4627	1.7019	17.0839	17.8448	15.9923	19.7634	20.1273	18.2417	2.7273	1.5365	2.7604	5.3406	3.2235	13.2136	142.0198
Ba	0.0025	0.0389	0.0124	0.1011	0.1094	0.0981	0.1110	0.1239	0.1153	0.0611	0.0366	0.0369	0.0647	0.0601	0.0812	1.0508
Be	0.0005	ND	ND	ND	0.0004	0.0005	0.0006	0.0006	0.0005	ND	ND	ND	ND	ND	0.0004	0.0029
Bi	0.0664	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	1.3280	21.1602	17.5214	129.0001	131.6465	116.0990	157.7795	154.1407	141.5704	21.4910	12.5595	19.8370	36.7077	26.4530	104.5211	1090.4871
Cd	0.1494	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	0.0075	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	1.4940	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	1.2450	ND	ND	1.7797	1.7797	1.6143	1.9153	1.9815	1.8458	ND	ND	ND	ND	ND	1.4555	12.3718
K	0.9960	ND	ND	ND	1.3159	0.9090	ND	1.1935	0.9421	ND	ND	ND	ND	ND	ND	4.3605
Mg	0.0498	2.1270	1.8293	13.3080	13.5395	11.7863	16.0205	15.7559	14.5319	2.1932	1.3662	2.1270	3.7810	2.7886	10.5954	111.7499
Mn	0.0249	ND	ND	0.0443	0.0447	0.0404	0.0500	0.0506	0.0476	ND	ND	ND	ND	ND	0.0390	0.3166
Mo	0.0100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	0.9960	1.7306	1.1352	5.7002	5.5017	5.0386	6.1302	6.4280	5.9318	1.3998	0.7052	0.8706	2.1276	1.7306	4.2116	48.6417
Ni	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	0.0996	0.0648	ND	0.0479	0.0502	0.0843	0.0833	0.1068	0.0486	ND	ND	ND	ND	ND	ND	0.4860
Pb	1.2450	ND	ND	0.0129	0.0139	0.0104	0.0154	0.0169	0.0159	0.0087	ND	ND	ND	ND	0.0152	0.1092
S	0.2490	0.6755	0.2851	0.8574	0.5498	0.4538	0.3281	0.4638	0.4770	0.2322	0.0569	0.0668	0.4208	0.1826	0.2620	5.3118
Sb	0.3486	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	0.0013	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	0.2656	0.3903	0.2918	0.4267	0.3837	0.4036	0.3506	0.4201	0.3275	0.3837	0.3804	0.3407	0.3540	0.4135	0.4929	5.3596
Sn	0.0747	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr	0.4316	0.4062	0.3599	1.8386	1.8618	1.6434	2.1462	2.1297	1.9808	0.4195	0.3004	0.3897	0.6113	0.4790	1.4813	16.0480
Te	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ti	0.1743	0.1413	0.0685	0.4523	0.4456	0.3762	0.4357	0.5184	0.4820	0.1314	0.0454	0.0355	0.1578	0.1512	0.3166	3.7580
Tl	0.0747	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
V	0.0125	ND	ND	0.0326	0.0364	0.0288	0.0330	0.0341	0.0305	ND	ND	ND	0.0133	ND	0.0257	0.2344
Zn	0.4316	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zr	0.0149	0.0251	0.0151	0.0447	0.0440	0.0431	0.0364	0.0487	0.0440	0.0290	0.0202	0.0179	0.0328	0.0272	0.0311	0.4593

Notes:
MDL = Method Detection Limit
ND = Value below the specified detection limit

Table A11. Metal Concentrations (µg/m^3) in Size Fractionated LPI Samples at Burnaby Lake (August 29-September 12, 1995)

Sample:		Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage CO	Stage L2	Stage L3	Stage L4	Stage L5	Stage LF	Stage BU	Total
Particle Diameter (µm):		>35	21.7	15.7	10.5	6.6	3.3	2	1.4	0.9	0.52	0.23	0.11	0.08	<0.08	all fractions
Parameter	MDL															
Ag	0.0003	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Al	0.1660	ND	ND	35.6199	28.0367	38.9170	36.1145	32.6526	23.7505	ND	3.4076	3.2427	ND	0.7699	ND	202.5115
As	0.0013	ND	ND	0.0010	0.0011	0.0011	0.0012	0.0011	ND	ND	ND	ND	0.0006	ND	0.0006	0.0068
B	0.0996	0.1393	ND	9.0743	8.2500	11.1020	8.5138	9.7502	6.9147	ND	0.9305	0.9141	ND	0.3700	0.0898	56.0487
Ba	0.0025	ND	ND	0.0449	0.0322	0.0527	0.0435	0.0388	0.0270	ND	0.0011	0.0026	ND	ND	ND	0.2428
Be	0.0005	ND	ND	0.0002	ND	ND	0.0002	ND	ND	ND	ND	ND	ND	ND	ND	0.0004
Bi	0.0664	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	1.3280	ND	ND	85.0589	66.1008	93.4664	87.0371	76.1568	55.5502	ND	7.4130	6.9185	ND	0.9178	ND	478.6195
Cd	0.1494	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	0.0075	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	0.0498	ND	ND	ND	ND	0.0249	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0249
Cu	1.4940	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	1.2450	ND	ND	1.0485	0.8342	1.1210	1.0155	0.9430	0.7254	ND	ND	ND	ND	ND	ND	5.6874
K	0.9960	ND	ND	0.7580	ND	0.6113	0.6739	0.4711	ND	ND	ND	ND	ND	ND	ND	2.5143
Mg	0.0498	ND	ND	8.1652	6.3683	8.9730	8.3960	7.3574	5.3792	ND	0.8127	0.7633	ND	0.1533	ND	46.3683
Mn	0.0249	ND	ND	0.0256	0.0213	0.0290	0.0260	0.0247	0.0193	ND	ND	ND	ND	ND	ND	0.1459
Mo	0.0100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	0.9960	ND	ND	2.8242	2.0000	3.2034	3.0056	2.2802	1.5219	ND	0.0217	ND	ND	ND	ND	14.8569
Ni	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	0.0996	ND	ND	ND	0.0455	0.0742	0.0481	0.0585	0.0247	ND	ND	0.0288	ND	ND	ND	0.2798
Pb	1.2450	ND	ND	0.0077	0.0064	0.0087	0.0078	0.0063	0.0052	ND	ND	0.0049	ND	ND	ND	0.0470
S	0.2490	ND	ND	0.4141	0.1965	0.4092	0.2773	0.1850	0.0349	ND	ND	0.0943	ND	ND	ND	1.6112
Sb	0.3486	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	0.0013	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	0.2656	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sn	0.0747	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr	0.4316	ND	ND	1.0712	0.8619	1.1866	1.0910	0.9839	0.7349	ND	0.1645	0.1579	ND	ND	ND	6.2520
Te	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ti	0.1743	ND	ND	0.2666	0.1809	0.3540	0.2781	0.2188	0.1083	ND	ND	0.0015	ND	ND	ND	1.4082
Tl	0.0747	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
V	0.0125	ND	ND	0.0163	0.0156	0.0229	0.0147	0.0186	0.0112	ND	ND	ND	ND	ND	ND	0.0993
Zn	0.4316	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zr	0.0149	ND	ND	0.0138	0.0148	0.0223	0.0155	0.0195	0.0116	ND	ND	0.0063	ND	ND	ND	0.1037

Notes:
MDL = Method Detection Limit
ND = Value below the specified detection limit

Table A12. Metal Concentrations (µg/m^3) in Size Fractionated LPI Samples at Burnaby Lake (September 12-19, 1995)

Sample:		Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage CO	Stage L2	Stage L3	Stage L4	Stage L5	Stage LF	Stage BU	Total
Particle Diameter (µm):		>35	21.7	15.7	10.5	6.6	3.3	2	1.4	0.9	0.52	0.23	0.11	0.08	<0.08	all fractions
Parameter	MDL															
Ag	0.0003	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Al	0.1660	3.7606	14.9718	98.4553	32.7229	23.0465	46.0696	96.7870	7.5644	0.2237	8.2651	23.3802	ND	ND	13.8707	369.1178
As	0.0013	ND	0.0023	0.0013	0.0015	ND	ND	0.0028	ND	ND	0.0013	0.0013	ND	ND	0.0013	0.0115
B	0.0996	1.1494	3.4517	27.5758	8.6569	7.7226	11.1260	26.8084	1.9502	0.4820	2.1170	5.7874	ND	ND	3.6519	100.4793
Ba	0.0025	ND	0.0032	0.1130	0.0132	0.0166	0.0352	0.1227	ND	ND	0.0035	0.0309	ND	ND	0.0272	0.3655
Be	0.0005	ND	ND	0.0004	ND	0.0004	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0008
Bi	0.0664	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	1.3280	8.6644	33.0221	236.2253	79.0682	52.3748	113.1022	233.5560	12.6684	ND	18.6745	60.0492	ND	ND	34.0231	881.4283
Cd	0.1494	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	0.0075	ND	ND	0.0098	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0098
Cr	0.0498	ND	ND	0.0584	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0584
Cu	1.4940	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	1.2450	ND	ND	2.6226	ND	ND	1.4414	2.6059	ND	ND	ND	ND	ND	ND	ND	6.6700
K	0.9960	ND	ND	1.7678	ND	ND	0.9069	1.1305	ND	ND	ND	ND	ND	ND	ND	3.8051
Mg	0.0498	1.2779	3.6136	22.6660	7.7511	5.2152	11.1211	22.5993	1.6450	ND	2.1455	5.7491	ND	ND	3.5135	87.2973
Mn	0.0249	ND	ND	0.0707	0.0287	ND	0.0374	0.0661	ND	ND	ND	0.0297	ND	ND	ND	0.2325
Mo	0.0100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	0.9960	ND	0.8447	8.3523	1.7123	1.7123	3.2472	8.3189	ND	ND	0.0773	2.3462	ND	ND	1.7123	28.3235
Ni	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	0.0996	ND	ND	0.1281	ND	0.0637	0.0604	0.0710	ND	ND	ND	0.0817	ND	0.1094	0.1358	0.6500
Pb	1.2450	ND	ND	0.0205	0.0085	ND	0.0103	0.0203	ND	ND	ND	0.0085	ND	ND	0.0083	0.0764
S	0.2490	0.1808	0.2709	1.0484	ND	0.0340	ND	0.6780	ND	ND	ND	0.4111	ND	0.1575	0.5712	3.3519
Sb	0.3486	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	0.0013	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	0.2656	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sn	0.0747	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr	0.4316	0.2396	0.5532	2.9156	1.0504	0.8369	1.4375	2.9123	0.2997	ND	0.3664	0.8168	ND	ND	0.6166	12.0450
Te	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ti	0.1743	ND	0.1325	0.7164	0.1525	0.1258	0.3427	0.7765	ND	ND	0.0791	0.2460	ND	0.0061	0.2793	2.8571
Tl	0.0747	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
V	0.0125	ND	ND	0.0377	0.0137	0.0156	0.0177	0.0328	ND	ND	ND	ND	ND	ND	ND	0.1176
Zn	0.4316	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zr	0.0149	ND	0.0122	0.0404	ND	0.0236	0.0148	0.0394	ND	0.0163	ND	0.0197	ND	0.0163	0.0269	0.2097

Notes:
MDL = Method Detection Limit
ND = Value below the specified detection limit

Table A13. Metal Concentrations (µg/m^3) in Size Fractionated LPI Samples at Burnaby Lake (September 19-26, 1995)

Sample:		Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage CO	Stage L2	Stage L3	Stage L4	Stage L5	Stage LF	Stage BU	Total
Particle Diameter (µm):		>35	21.7	15.7	10.5	6.6	3.3	2	1.4	0.9	0.52	0.23	0.11	0.08	<0.08	all fractions
Parameter	MDL															
Ag	0.0003	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Al	0.1660	ND	0.1559	36.4713	59.3342	19.2414	2.9723	6.3189	59.3342	ND	2.7404	ND	ND	ND	4.5297	191.0982
As	0.0013	ND	ND	ND	0.0020	ND	ND	ND	0.0017	ND	0.0012	ND	ND	ND	0.0017	0.0067
B	0.0996	ND	ND	9.2262	17.7086	5.0844	1.0751	2.2680	16.4164	ND	0.7769	ND	ND	ND	1.1414	53.6970
Ba	0.0025	ND	ND	0.0393	0.0764	0.0158	ND	ND	0.1033	ND	ND	ND	ND	0.0158	ND	0.2505
Be	0.0005	ND	ND	ND	0.0005	ND	ND	ND	0.0004	ND	ND	ND	ND	ND	ND	0.0008
Bi	0.0664	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	1.3280	ND	0.3868	84.4822	139.4855	44.7208	6.2847	12.9116	137.8288	ND	5.2907	ND	ND	0.3868	7.9415	439.7195
Cd	0.1494	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	0.0075	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	1.4940	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	1.2450	ND	ND	1.3883	1.9715	ND	ND	ND	1.9881	ND	ND	ND	ND	ND	ND	5.3479
K	0.9960	ND	ND	ND	1.0596	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.0596
Mg	0.0498	ND	0.1359	8.6249	13.8270	4.6156	0.8714	1.4679	13.7608	ND	0.6726	ND	ND	ND	1.0702	45.0464
Mn	0.0249	ND	ND	0.0331	0.0461	ND	ND	ND	0.0494	ND	ND	ND	ND	ND	ND	0.1286
Mo	0.0100	ND	ND	ND	ND	0.0111	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0111
Na	0.9960	ND	0.2093	3.7547	6.1073	1.7998	ND	ND	6.5711	ND	0.2424	ND	ND	0.7726	ND	19.4572
Ni	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	0.0996	ND	ND	0.0480	0.0712	ND	ND	ND	0.1361	ND	ND	ND	ND	0.0868	ND	0.3421
Pb	1.2450	ND	ND	0.0107	0.0154	0.0075	ND	ND	0.0174	ND	ND	ND	ND	0.0084	ND	0.0594
S	0.2490	0.0007	0.1133	0.3486	0.8920	0.1299	ND	ND	0.6633	ND	ND	ND	ND	0.4844	ND	2.6321
Sb	0.3486	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	0.0013	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	0.2656	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sn	0.0747	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr	0.4316	ND	ND	1.1922	1.9046	0.7316	0.2446	0.3373	1.8748	ND	0.1982	ND	ND	ND	0.2578	6.7411
Te	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ti	0.1743	ND	ND	0.3271	0.5789	0.1581	ND	ND	0.5955	ND	0.0620	ND	ND	0.1217	ND	1.8433
Tl	0.0747	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
V	0.0125	ND	ND	0.0167	0.0280	ND	ND	ND	0.0227	ND	ND	ND	ND	ND	ND	0.0673
Zn	0.4316	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zr	0.0149	ND	ND	0.0204	0.0418	0.0200	0.0158	0.0176	0.0461	0.0161	0.0190	ND	ND	0.0378	ND	0.2345

Notes:
MDL = Method Detection Limit
ND = Value below the specified detection limit

Table A14. Metal Concentrations (µg/m^3) in Size Fractionated LPI Samples at Burnaby Lake (September 26-October 3, 1995)

Sample:		Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage CO	Stage L2	Stage L3	Stage L4	Stage L5	Stage LF	Stage BU	Total
Particle Diameter (µm):		>35	21.7	15.7	10.5	6.6	3.3	2	1.4	0.9	0.52	0.23	0.11	0.08	<0.08	all fractions
Parameter	MDL															
Ag	0.0003	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Al	0.1660	ND	ND	28.9230	56.1808	27.6094	47.9706	47.6422	21.0412	ND	ND	ND	ND	ND	13.0281	242.3952
As	0.0013	ND	ND	0.0022	0.0020	ND	0.0022	0.0020	ND	ND	ND	ND	ND	ND	ND	0.0084
B	0.0996	ND	ND	9.4071	17.1904	8.9474	15.1871	15.5812	6.7470	ND	ND	ND	ND	ND	4.4153	77.4755
Ba	0.0025	ND	0.0009	0.0688	0.0974	0.0485	0.0931	0.0918	0.0646	0.0176	0.0074	0.0255	0.0166	ND	0.0061	0.5384
Be	0.0005	ND	ND	0.0004	0.0007	0.0005	0.0005	0.0006	0.0004	ND	ND	ND	ND	ND	0.0004	0.0034
Bi	0.0664	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	1.3280	ND	ND	70.5968	132.0090	65.0139	113.6182	112.9614	51.8776	ND	ND	ND	ND	ND	30.5311	576.6080
Cd	0.1494	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	0.0075	ND	ND	ND	ND	ND	ND	0.0082	ND	ND	ND	ND	ND	ND	ND	0.0082
Cr	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	1.4940	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	1.2450	ND	ND	1.3432	1.8194	ND	1.6683	1.7406	ND	ND	ND	ND	ND	ND	ND	6.5714
K	0.9960	ND	ND	ND	ND	ND	ND	1.1356	ND	ND	ND	ND	ND	ND	ND	1.1356
Mg	0.0498	ND	ND	6.9392	13.0476	6.4795	11.1429	11.2085	5.0673	ND	ND	ND	ND	ND	3.1626	57.0476
Mn	0.0249	ND	ND	0.0295	0.0437	0.0263	0.0394	0.0397	0.0258	ND	ND	ND	ND	ND	ND	0.2044
Mo	0.0100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	0.9960	0.2731	1.2584	3.5572	6.2502	3.0318	5.8232	5.5605	2.9989	1.0285	0.3388	1.0613	0.8314	ND	1.5211	33.5344
Ni	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	0.0996	ND	0.0650	0.1142	0.0821	0.0909	0.1103	0.1340	0.1008	0.0545	ND	0.0853	0.0564	ND	ND	0.8935
Pb	1.2450	ND	ND	ND	0.0091	ND	0.0077	0.0106	ND	ND	ND	ND	ND	ND	ND	0.0274
S	0.2490	0.0926	0.4374	0.7034	0.6148	0.2371	0.6575	0.5951	0.5852	0.3750	0.1189	0.5392	0.4834	ND	0.2305	5.6701
Sb	0.3486	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	0.0013	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	0.2656	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sn	0.0747	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr	0.4316	ND	ND	1.0667	1.8286	0.9912	1.6151	1.5921	0.8499	ND	ND	ND	ND	ND	0.5938	8.5374
Te	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ti	0.1743	0.0152	0.1009	0.3997	0.5409	0.2519	0.4621	0.5574	0.3045	0.0976	0.0184	0.1107	0.0943	ND	0.1994	3.1531
Tl	0.0747	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
V	0.0125	ND	ND	0.0241	0.0288	0.0162	0.0238	0.0381	0.0145	ND	ND	ND	ND	ND	0.0126	0.1581
Zn	0.4316	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zr	0.0149	ND	0.0220	0.0388	0.0381	0.0293	0.0450	0.0457	0.0418	0.0278	0.0183	0.0267	0.0236	0.0117	0.0210	0.3899

Notes:
MDL = Method Detection Limit
ND = Value below the specified detection limit

Table A15. Metal Concentrations (µg/m^3) in Size Fractionated LPI Samples at Burnaby Lake (October 3-10, 1995)

Sample:		Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage CO	Stage L2	Stage L3	Stage L4	Stage L5	Stage LF	Stage BU	Total
Particle Diameter (µm):		>35	21.7	15.7	10.5	6.6	3.3	2	1.4	0.9	0.52	0.23	0.11	0.08	<0.08	all fractions
Parameter	MDL															
Ag	0.0003	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Al	0.1660	ND	ND	24.4547	46.8777	ND	ND	ND	7.7880	ND	ND	ND	ND	ND	1.3957	80.5161
As	0.0013	ND	ND	0.0013	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0013
B	0.0996	ND	ND	7.2104	12.6990	ND	ND	ND	2.0899	ND	ND	ND	ND	ND	0.5839	22.5833
Ba	0.0025	ND	ND	0.0297	0.0504	ND	ND	ND	ND	0.0062	ND	ND	ND	ND	ND	0.0863
Be	0.0005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bi	0.0664	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	1.3280	ND	ND	64.5808	120.4710	ND	ND	ND	17.3920	2.0306	ND	ND	ND	ND	3.9717	208.4460
Cd	0.1494	ND	0.0018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0018
Co	0.0075	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	1.4940	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	1.2450	ND	ND	ND	1.6667	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.6667
K	0.9960	1.3916	ND	1.0736	0.9833	ND	ND	ND	1.0301	ND	ND	ND	ND	ND	ND	4.4785
Mg	0.0498	ND	ND	6.0676	11.6566	ND	ND	ND	1.8173	0.0134	ND	ND	ND	ND	0.2778	19.8327
Mn	0.0249	ND	0.0348	0.0305	0.0418	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.1071
Mo	0.0100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	0.9960	2.4872	0.0106	4.5622	6.7375	1.0816	ND	ND	1.5166	1.0146	ND	1.4162	ND	ND	ND	18.8265
Ni	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	0.0996	0.1087	0.0893	0.0783	0.0833	ND	ND	ND	ND	0.0779	ND	0.0796	ND	ND	ND	0.5172
Pb	1.2450	ND	ND	0.0075	0.0085	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0161
S	0.2490	1.6037	0.6231	1.1285	0.8373	0.3219	ND	ND	0.0642	0.6700	ND	0.6667	0.1312	0.0609	0.2383	6.3459
Sb	0.3486	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	0.0013	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	0.2656	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sn	0.0747	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr	0.4316	ND	ND	0.9565	1.6192	ND	ND	ND	0.3775	0.1734	ND	ND	ND	ND	0.2202	3.3468
Te	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ti	0.1743	0.0626	0.0526	0.3739	0.5814	0.0225	ND	ND	0.0168	0.1195	ND	0.0593	ND	ND	0.0526	1.3412
Tl	0.0747	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
V	0.0125	ND	ND	0.0151	0.0170	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0322
Zn	0.4316	0.5857	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.5857
Zr	0.0149	0.0159	0.0140	0.0205	0.0247	0.0138	ND	ND	ND	0.0143	ND	0.0181	ND	ND	ND	0.1213

Notes:
MDL = Method Detection Limit
ND = Value below the specified detection limit

Table A16. Metal Concentrations (µg/m^3) in Size Fractionated LPI Samples at Burnaby Lake (October 10-17, 1995)

Sample:		Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage CO	Stage L2	Stage L3	Stage L4	Stage L5	Stage LF	backup filter	Total
Particle Diameter (µm):		>35	21.7	15.7	10.5	6.6	3.3	2	1.4	0.9	0.52	0.23	0.11	0.08	<0.08	all fractions
Parameter	MDL															
Ag	0.0003	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Al	0.1660	ND	ND	ND	ND	2.0598	ND	ND	6.2503	ND	4.6134	ND	ND	ND	ND	12.9234
As	0.0013	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0012	ND	ND	ND	ND	0.0012
B	0.0996	ND	ND	ND	ND	0.5230	ND	ND	1.9118	ND	0.9034	ND	ND	ND	ND	3.3382
Ba	0.0025	ND	ND	ND	ND	ND	ND	ND	0.0038	ND	0.0087	ND	ND	ND	ND	0.0125
Be	0.0005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bi	0.0664	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	1.3280	ND	ND	1.0202	ND	6.7463	ND	ND	19.1249	ND	14.5640	ND	ND	ND	ND	41.4553
Cd	0.1494	ND	ND	ND	0.0017	ND	ND	ND	ND	ND	ND	ND	ND	0.0027	ND	0.0045
Co	0.0075	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	1.4940	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	1.2450	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
K	0.9960	ND	ND	1.5893	ND	1.8046	0.9165	ND	1.2843	ND	ND	ND	1.3976	1.7891	ND	8.7814
Mg	0.0498	ND	ND	0.0008	ND	0.6625	ND	ND	1.6717	ND	1.2990	ND	ND	ND	ND	3.6339
Mn	0.0249	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mo	0.0100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	0.9960	0.0034	0.5519	1.7394	0.0532	0.1906	0.6390	ND	2.0940	0.0562	1.9866	ND	1.7431	1.0316	0.4060	10.4949
Ni	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	0.0996	ND	ND	ND	0.0558	ND	ND	ND	0.0607	ND	0.0756	0.0499	0.0831	0.0703	ND	0.3954
Pb	1.2450	ND	ND	0.0075	0.0250	0.0075	ND	ND	0.0100	ND	0.0125	ND	ND	ND	0.0075	0.0699
S	0.2490	0.2896	0.2543	0.2409	0.2623	0.1159	0.3281	ND	0.8838	0.0387	0.5939	ND	1.5223	1.0597	0.2516	5.8410
Sb	0.3486	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	0.0013	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0140	ND	0.0140
Si	0.2656	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sn	0.0747	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr	0.4316	ND	ND	0.1821	ND	0.2584	ND	ND	0.4395	ND	0.3261	ND	ND	ND	ND	1.2062
Te	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ti	0.1743	ND	ND	0.0292	ND	0.0587	ND	ND	0.2619	ND	0.2052	ND	0.0132	ND	ND	0.5681
Tl	0.0747	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
V	0.0125	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zn	0.4316	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zr	0.0149	0.0145	ND	ND	ND	ND	ND	ND	0.0230	ND	0.0138	ND	ND	ND	ND	0.0513

Notes:
MDL = Method Detection Limit
ND = Value below the specified detection limit

Table A17. Metal Concentrations (µg/m^3) in Size Fractionated LPI Samples at Burnaby Lake (October 17-24, 1995)

Sample:		Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage CO	Stage L2	Stage L3	Stage L4	Stage L5	Stage LF	backup filter	Total
Particle Diameter (µm):		>35	21.7	15.7	10.5	6.6	3.3	2	1.4	0.9	0.52	0.23	0.11	0.08	<0.08	all fractions
Parameter	MDL															
Ag	0.0003	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Al	0.1660	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.6700	2.6700
As	0.0013	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B	0.0996	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.8458	0.8458
Ba	0.0025	ND	ND	ND	ND	ND	ND	ND	0.0033	0.0017	ND	ND	ND	ND	0.0249	0.0299
Be	0.0005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bi	0.0664	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	1.3280	0.1327	0.1161	0.1161	0.0995	0.1493	0.0829	0.0995	0.1658	0.1161	0.1161	0.1327	0.0829	0.1824	9.8342	11.4262
Cd	0.1494	ND	ND	ND	ND	0.0003	0.0005	ND	0.0002	0.0002	ND	ND	ND	ND	ND	0.0012
Co	0.0075	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	0.0498	0.0033	0.0050	0.0033	0.0299	0.0050	0.0116	0.0033	0.0033	0.0050	0.0033	0.0182	ND	0.0033	0.0066	0.1012
Cu	1.4940	ND	ND	ND	0.0116	ND	ND	ND	ND	ND	ND	ND	0.0166	ND	ND	0.0282
Fe	1.2450	ND	0.0995	ND	ND	0.1161	0.0995	ND	0.1493	0.0829	ND	0.1658	0.1327	0.0829	0.2819	1.2106
K	0.9960	ND	0.6633	ND	ND	ND	0.6633	ND	ND	ND	ND	0.6633	ND	ND	ND	1.9900
Mg	0.0498	0.0498	0.0498	0.0663	0.0498	0.0663	0.0498	0.0332	0.0829	0.0332	0.0498	0.0498	0.0498	0.0498	0.9453	1.6252
Mn	0.0249	0.0033	ND	ND	ND	ND	ND	ND	0.0033	ND	ND	0.0050	ND	ND	0.0083	0.0199
Mo	0.0100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0083	ND	ND	ND	0.0083
Na	0.9960	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.8242	1.8242
Ni	0.0498	ND	ND	ND	ND	0.0332	ND	ND	ND	ND	ND	0.0166	ND	ND	0.0166	0.0663
P	0.0996	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pb	1.2450	ND	ND	0.0365	ND	0.0348	0.0464	ND	0.0381	0.0481	ND	0.0066	0.0282	0.0050	ND	0.2438
S	0.2490	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.8292	0.8292
Sb	0.3486	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	0.0013	0.0008	ND	ND	ND	ND	ND	ND	ND	ND	0.0008	0.0010	0.0010	0.0010	0.0012	0.0058
Si	0.2656	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sn	0.0747	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr	0.4316	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.1509	0.1509
Te	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ti	0.1743	ND	ND	ND	ND	ND	ND	ND	ND	0.0050	ND	ND	ND	ND	0.1808	0.1857
Tl	0.0747	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
V	0.0125	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zn	0.4316	0.0829	ND	ND	0.0829	0.2985	0.0663	ND	ND	ND	ND	0.0332	0.0332	1.0614	0.0332	1.6915
Zr	0.0149	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0050	0.0050

Notes:
MDL = Method Detection Limit
ND = Value below the specified detection limit

Table A18. Metal Concentrations (µg/m^3) in Size Fractionated LPI Samples at Burnaby Lake (October 31- November 7, 1995)

Sample:	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage CO	Stage L2	Stage L3	Stage L4	Stage L5	Stage LF	backup filter	Total
Particle Diameter (µm):	>35	21.7	15.7	10.5	6.6	3.3	2	1.4	0.9	0.52	0.23	0.11	0.08	<0.08	all fractions
Parameter MDL															
Ag 0.0003	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Al 0.1660	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.0629	0.9768	4.0397
As 0.0013	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B 0.0996	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.3974	0.3974
Ba 0.0025	0.0033	ND	ND	ND	ND	ND	ND	0.0033	ND	ND	0.0033	0.0033	ND	0.0083	0.0215
Be 0.0005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bi 0.0664	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca 1.3280	0.1159	0.0497	0.0662	0.0993	0.0166	0.0828	0.1159	0.0331	0.0331	0.0497	0.0497	0.1325	0.1490	5.1159	6.1093
Cd 0.1494	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co 0.0075	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr 0.0498	0.0149	0.0149	ND	ND	ND	ND	0.0248	0.0050	0.0116	ND	ND	0.0166	0.0099	ND	0.0977
Cu 1.4940	ND	ND	ND	ND	ND	ND	0.0033	ND	0.0050	0.0596	ND	ND	ND	ND	0.0679
Fe 1.2450	0.2318	0.2815	0.1987	0.1490	ND	0.1987	0.2318	0.1159	0.1325	0.2152	0.1987	0.2815	0.1987	0.1821	2.6159
K 0.9960	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mg 0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.4967	0.4967
Mn 0.0249	0.0066	0.0050	0.0033	ND	ND	ND	0.0066	0.0050	0.0033	ND	0.0066	0.0066	0.0447	0.0083	0.0960
Mo 0.0100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na 0.9960	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.8278	0.9934	1.8212
Ni 0.0498	0.0497	ND	ND	ND	ND	ND	0.0331	ND	ND	ND	ND	0.0662	0.0166	ND	0.1656
P 0.0996	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pb 1.2450	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
S 0.2490	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.3311	0.3311	0.3311	0.9934
Sb 0.3486	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se 0.0013	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si 0.2656	ND	ND	1.4901	1.8212	ND	ND	ND	2.4834	ND	ND	ND	ND	ND	ND	5.7947
Sn 0.0747	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr 0.4316	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0745	0.0745
Te 0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ti 0.1743	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0629	0.0629
Tl 0.0747	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
V 0.0125	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zn 0.4316	0.0497	0.0166	ND	0.1325	ND	0.0331	ND	ND	ND	0.0497	0.0166	0.0993	0.1159	0.0166	0.5298
Zr 0.0149	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes:
MDL = Method Detection Limit
ND = Value below the specified detection limit

Table A19. Metal Concentrations (µg/m^3) in Size Fractionated LPI Samples at Burnaby Lake (November 7-14, 1995)

Sample:		Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage CO	Stage L2	Stage L3	Stage L4	Stage L5	Stage LF	Stage BU	Total
Particle Diameter (µm):		>35	21.7	15.7	10.5	6.6	3.3	2	1.4	0.9	0.52	0.23	0.11	0.08	<0.08	all fractions
Parameter	MDL															
Ag	0.0003	0.0001	0.0001	ND	ND	ND	ND	0.0001	ND	ND	ND	0.0001	0.0001	0.0002	ND	0.0009
Al	0.1660	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	10.6620	10.8283
As	0.0013	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0025	ND	0.0038
B	0.0996	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.9940	3.0938
Ba	0.0025	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0388	0.0413
Be	0.0005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0005
Bi	0.0664	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0665
Ca	1.3280	0.0250	ND	ND	0.0250	ND	ND	ND	ND	ND	ND	ND	ND	ND	28.4514	29.8320
Cd	0.1494	0.0003	0.0001	0.0003	0.0003	0.0001	0.0001	0.0001	0.0001	0.0001	ND	ND	0.0001	ND	ND	0.1513
Co	0.0075	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0075
Cr	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0069	0.0568
Cu	1.4940	0.0288	0.0288	ND	ND	ND	ND	0.0022	ND	ND	0.0371	ND	ND	ND	ND	1.5940
Fe	1.2450	0.0305	ND	ND	0.0139	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.4962	1.7881
K	0.9960	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.9980
Mg	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.8277	2.8776
Mn	0.0249	0.0039	0.0039	ND	0.0022	ND	ND	0.0022	ND	ND	ND	ND	0.0022	0.0055	0.0172	0.0621
Mo	0.0100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0100
Na	0.9960	ND	ND	ND	ND	ND	ND	0.6653	ND	ND	ND	ND	ND	ND	2.8443	4.5077
Ni	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0205	0.0704
P	0.0996	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.1377	0.2375
Pb	1.2450	ND	ND	ND	0.0019	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.2494
S	0.2490	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.1386	0.1386	ND	1.1200	1.6467
Sb	0.3486	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.3493
Se	0.0013	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0013
Si	0.2656	1.6356	ND	ND	ND	ND	ND	ND	ND	1.1366	0.6376	0.9703	ND	ND	ND	4.6463
Sn	0.0747	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0749
Sr	0.4316	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.4158	0.8483
Te	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0499
Ti	0.1743	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.2994	0.4741
Tl	0.0747	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0749
V	0.0125	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0125
Zn	0.4316	0.0083	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0549	0.4957
Zr	0.0149	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0103	0.0253

Notes:
MDL = Method Detection Limit
ND = Value below the specified detection limit

Table A20. Metal Concentrations (µg/m^3) in Size Fractionated LPI Samples at Burnaby Lake (November 14-21, 1995)

Sample:		Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage CO	Stage L2	Stage L3	Stage L4	Stage L5	Stage LF	backup filter	Total
Particle Diameter (µm):		>35	21.7	15.7	10.5	6.6	3.3	2	1.4	0.9	0.52	0.23	0.11	0.08	<0.08	all fractions
Parameter	MDL															
Ag	0.0003	ND	ND	ND	ND	0.0009	ND	ND	0.0001	ND	ND	0.0001	0.0001	ND	ND	0.0012
Al	0.1660	ND	0.0332	ND	0.0996	ND	ND	0.1328	0.0166	ND	ND	ND	ND	ND	1.1616	1.4437
As	0.0013	ND	0.0017	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0012	ND	0.0028
B	0.0996	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.3319	0.3319
Ba	0.0025	ND	ND	ND	ND	ND	ND	0.0006	0.0039	ND	ND	ND	0.0022	ND	0.0105	0.0171
Be	0.0005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bi	0.0664	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	1.3280	ND	ND	ND	ND	0.0581	ND	0.2406	0.0581	ND	0.1079	ND	0.0415	ND	4.7876	5.2937
Cd	0.1494	0.0001	ND	0.0001	0.0001	ND	ND	0.0004	0.0001	ND	ND	ND	0.0001	ND	ND	0.0010
Co	0.0075	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	0.0498	ND	ND	ND	ND	ND	0.0011	0.0028	ND	0.0011	ND	ND	0.0094	ND	ND	0.0144
Cu	1.4940	ND	ND	ND	0.0205	ND	ND	ND	0.0022	0.0022	ND	ND	0.0039	0.0271	ND	0.0559
Fe	1.2450	ND	ND	ND	ND	ND	ND	ND	0.1798	ND	ND	ND	ND	ND	0.0802	0.2600
K	0.9960	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mg	0.0498	0.0166	ND	ND	0.0498	0.2489	0.0498	0.2489	0.0830	ND	0.2323	ND	0.2323	ND	0.3983	1.5599
Mn	0.0249	ND	ND	0.0022	ND	ND	ND	0.0089	0.0039	ND	ND	ND	ND	ND	0.0039	0.0188
Mo	0.0100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	0.9960	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.3276	1.3276
Ni	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	0.0996	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pb	1.2450	ND	ND	0.0019	ND	ND	ND	0.0036	ND	ND	ND	ND	0.0019	ND	ND	0.0075
S	0.2490	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.6361	0.6361
Sb	0.3486	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0664	0.0664
Se	0.0013	0.0005	0.0005	0.0005	0.0005	0.0004	ND	ND	ND	ND	ND	0.0007	0.0007	0.0004	ND	0.0042
Si	0.2656	ND	ND	ND	ND	20.0520	ND	5.9465	ND	ND	1.9637	ND	3.4572	ND	ND	31.4194
Sn	0.0747	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0332	0.0332
Sr	0.4316	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0780	0.0780
Te	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ti	0.1743	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.1112	0.1112
Tl	0.0747	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
V	0.0125	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zn	0.4316	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0083	ND	0.0083
Zr	0.0149	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes:
MDL = Method Detection Limit
ND = Value below the specified detection limit

Table A21. Metal Concentrations (µg/m^3) in Size Fractionated LPI Samples at Burnaby Lake (November 21-28, 1995)

Sample:		Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage CO	Stage L2	Stage L3	Stage L4	Stage L5	Stage LF	backup filter	Total
Particle Diameter (µm):		>35	21.7	15.7	10.5	6.6	3.3	2	1.4	0.9	0.52	0.23	0.11	0.08	<0.08	all fractions
Parameter	MDL															
Ag	0.0003	ND	0.0525	0.0225	ND	ND	0.0075	ND	ND	0.0025	0.0175	ND	ND	ND	ND	0.1105
Al	0.1660	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.0000	4.0000	ND	82.0000	95.0000
As	0.0013	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0400
B	0.0996	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	30.0000	33.0000
Ba	0.0025	0.0667	ND	ND	ND	ND	ND	ND	0.0167	ND	ND	0.0167	ND	ND	0.2667	0.4417
Be	0.0005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0150
Bi	0.0664	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.0000
Ca	1.3280	0.7500	ND	ND	ND	ND	ND	ND	0.2500	ND	ND	ND	3.7500	ND	236.2500	281.0000
Cd	0.1494	0.0083	ND	0.0083	ND	ND	ND	ND	ND	ND	0.0033	ND	0.0033	ND	ND	4.5233
Co	0.0075	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.2250
Cr	0.0498	0.0833	ND	0.0333	ND	0.0333	ND	0.0333	ND	ND	ND	0.0333	ND	0.3833	0.1333	2.2333
Cu	1.4940	0.0667	ND	ND	ND	ND	ND	ND	0.1667	ND	ND	0.9667	ND	ND	ND	46.2000
Fe	1.2450	9.9167	ND	ND	ND	0.9167	ND	ND	1.9167	ND	3.4167	1.9167	ND	0.9167	3.9167	60.4167
K	0.9960	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	20.0000	50.0000
Mg	0.0498	3.0000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	25.5000	30.0000
Mn	0.0249	0.1667	ND	ND	ND	ND	ND	ND	ND	ND	20.5667	1.8667	0.1167	ND	0.2167	23.6833
Mo	0.0100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.3000
Na	0.9960	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	25.0000	55.0000
Ni	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.5000
P	0.0996	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.0000
Pb	1.2450	ND	ND	0.1583	ND	ND	ND	ND	ND	ND	0.4583	ND	0.0583	ND	ND	38.1750
S	0.2490	ND	ND	ND	ND	ND	ND	ND	4.1667	ND	9.1667	ND	4.1667	4.1667	9.1667	38.3333
Sb	0.3486	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	10.5000
Se	0.0013	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0400
Si	0.2656	ND	39.1667	ND	ND	ND	ND	ND	39.1667	ND	ND	ND	ND	ND	ND	86.3333
Sn	0.0747	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.2500
Sr	0.4316	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.4000	16.4000
Te	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.5000
Ti	0.1743	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.8000	7.0500
Tl	0.0747	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.2500
V	0.0125	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.3750
Zn	0.4316	ND	0.7500	ND	ND	10.7500	ND	0.2500	0.2500	ND	1.7500	4.2500	2.2500	ND	ND	33.2500
Zr	0.0149	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.4500

Notes:
MDL = Method Detection Limit
ND = Value below the specified detection limit

Table A22. Metal Concentrations (µg/m^3) in Size Fractionated LPI Samples at Burnaby Lake (November 28- December 5, 1995)

Sample:		Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage CO	Stage L2	Stage L3	Stage L4	Stage L5	Stage LF	Stage BU	Total
Particle Diameter (µm):		>35	21.7	15.7	10.5	6.6	3.3	2	1.4	0.9	0.52	0.23	0.11	0.08	<0.08	all fractions
Parameter	MDL															
Ag	0.0003	0.0001	0.0004	0.0052	0.0001	ND	ND	0.0027	0.0001	0.0001	ND	0.0002	0.0001	0.0001	0.0001	0.0095
Al	0.1660	ND	ND	ND	ND	0.2156	0.3317	0.0332	0.0663	ND	ND	ND	0.2985	ND	21.7413	22.8524
As	0.0013	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0013
B	0.0996	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.3018	6.4013
Ba	0.0025	0.0006	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0486	0.0517
Be	0.0005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0005
Bi	0.0664	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0663
Ca	1.3280	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	59.2123	60.5390
Cd	0.1494	0.0001	ND	0.0004	ND	ND	0.0001	0.0001	0.0004	0.0001	0.0003	ND	0.0001	0.0004	0.0001	0.1515
Co	0.0075	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0075
Cr	0.0498	ND	0.0011	ND	ND	ND	0.0011	ND	0.0011	ND	ND	ND	ND	ND	0.0127	0.0658
Cu	1.4940	ND	ND	ND	ND	ND	ND	0.0105	ND	0.0022	ND	ND	0.0105	0.0022	0.0055	1.5235
Fe	1.2450	0.0138	ND	ND	ND	ND	ND	0.0138	ND	ND	ND	ND	0.0138	ND	0.7933	2.0785
K	0.9960	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.9950
Mg	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.6219	5.6716
Mn	0.0249	0.0072	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0254	0.0575
Mo	0.0100	ND	ND	ND	ND	ND	0.0066	ND	ND	ND	ND	ND	ND	ND	ND	0.0166
Na	0.9960	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	10.2819	3.6484	14.9254
Ni	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0138	0.0138	0.0774
P	0.0996	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0995
Pb	1.2450	ND	0.0152	0.0053	ND	ND	ND	ND	0.0069	ND	0.0036	ND	0.0019	ND	0.0069	1.2836
S	0.2490	0.4699	ND	ND	ND	ND	ND	ND	ND	0.3040	ND	ND	ND	7.2692	0.8015	9.0934
Sb	0.3486	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.3483
Se	0.0013	ND	ND	ND	ND	ND	ND	ND	ND	0.0004	ND	ND	ND	ND	ND	0.0017
Si	0.2656	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.2653
Sn	0.0747	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0746
Sr	0.4316	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.7463	1.1774
Te	0.0498	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0498
Ti	0.1743	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.3615	0.5357
Tl	0.0747	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0746
V	0.0125	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0066	0.0191
Zn	0.4316	0.0083	0.0415	0.0746	0.0083	0.0249	ND	0.0912	0.0580	0.0249	0.0249	0.0083	0.0083	0.0746	0.0746	0.9536
Zr	0.0149	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0149

Notes:
MDL = Method Detection Limit
ND = Value below the specified detection limit

11. APPENDIX B - SIZE FRACTIONATED METAL DEPOSITION RATES

Table B1. Mean Size Fractionated Deposition Velocities (cm/s) for Metals Measured in Dry Atmospheric Samples from Burnaby Lake (April 11-October 10, 1995) (n=11)

Particle Diameter (μm):	>35	21.7	15.7	10.5	6.6	<6.6
Mean deposition velocity (+/- SE):	13.3 (0.38)	7.81(0.22)	4.57 (0.13)	1.75 (0.050)	0.32 (0.0091)	0.22 (0.0062)

Table B2. Size Fractionated Deposition Rates (µg/m^2/day) for Metals in Atmospheric Particles from Burnaby Lake (April 11-18, 1995)

Sample:	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage CO	Stage L2	Stage L3	Stage L4	Stage L5	Stage LF	Stage BU	Total
Particle Diameter (µm):	>35	21.7	15.7	10.5	6.6	3.3	2.0	1.4	0.9	0.52	0.23	0.11	0.08	<0.08	all fractions
Parameter															
Ag	19.1099	16.0423	2.2825	ND	0.1027	0.3762	0.2041	ND	0.3188	ND	0.1849	ND	0.4017	0.4081	39.4313
Al	ND	ND	86023.9150	48473.4004	7846.4014	3256.6293	3958.0700	2172.5847	ND	ND	ND	ND	ND	195.7975	151926.7982
As	584.9966	29.7929	268.5289	43.2842	5.2265	ND	ND	12.1158	1.0840	ND	ND	ND	ND	7.6521	952.6811
B	ND	ND	24227.6182	12389.9447	1870.7959	768.0582	1086.8949	576.7562	ND	ND	ND	ND	ND	66.6176	40986.6858
Ba	ND	ND	ND	18.3496	1.4569	ND	ND	ND	ND	ND	ND	ND	ND	ND	19.8066
Be	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bi	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	ND	ND	217464.5803	119529.9862	18849.8556	7777.5311	9690.5511	5226.8379	ND	ND	ND	ND	ND	571.8228	379111.1651
Cd	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	ND	ND	ND	2215.7385	354.6586	ND	242.3159	ND	ND	ND	ND	ND	ND	ND	2812.7129
K	20310.9597	ND	3770.1044	ND	ND	ND	568.0374	ND	ND	ND	ND	ND	ND	ND	24649.1015
Mg	ND	ND	22462.4488	12227.7857	1934.7562	811.7583	1066.8276	492.9216	ND	ND	ND	ND	ND	46.5503	39043.0484
Mn	857.9950	ND	104.7263	49.4676	8.2131	ND	26.7823	ND	ND	ND	ND	ND	ND	ND	1047.1844
Mo	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	6363.6335	10614.7779	14274.6097	7539.5451	1085.6016	486.6538	933.0251	422.8865	231.5845	231.5845	231.5845	104.0498	ND	231.5845	42751.1210
Ni	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	756.1406	ND	ND	ND	14.3621	ND	ND	9.1751	18.1025	ND	9.8127	ND	11.0881	ND	818.6811
Pb	66.2996	107.7128	69.8175	31.4326	4.0132	4.6550	ND	ND	ND	3.8260	ND	ND	ND	ND	287.7568
S	16816.5557	7590.2298	1627.2350	1139.7978	159.7795	39.0232	440.7574	128.2975	294.0925	198.4415	204.8183	236.7019	141.0509	51.7767	29068.5579
Sb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND	1.6580	ND	ND	ND	ND	ND	ND	ND	1.6580
Si	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sn	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr	ND	ND	3528.5710	1817.9748	291.9470	135.7017	161.2086	103.8180	ND	ND	ND	ND	ND	40.0507	6079.2717
Te	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ti	ND	85.1867	1298.5668	756.0156	108.9335	48.9204	74.4274	42.5437	10.6600	1.0949	2.3703	0.4573	ND	10.6600	2439.8366
Tl	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
V	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zn	ND	ND	ND	ND	ND	ND	146.6649	ND	ND	ND	ND	ND	ND	ND	146.6649
Zr	180.0327	103.5017	82.1195	44.9138	6.8283	3.4538	7.0248	4.4741	4.7291	3.4538	3.2625	3.6451	2.6886	3.1987	453.3265

Table B3. Size Fractionated Deposition Rates (µg/m^2/day) for Metals in Atmospheric Particulates from Burnaby Lake (April 25 - May 2, 1995)

Sample:	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage CO	Stage L2	Stage L3	Stage L4	Stage L5	Stage LF	Stage BU	Total
Particle Diameter (µm):	>35	21.7	15.7	10.5	6.6	3.3	2.0	1.4	0.9	0.52	0.23	0.11	0.08	<0.08	all fractions
Parameter															
Ag	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Al	0.0000	0.0000	123864.1546	70376.3008	3977.0626	2775.7556	4189.9228	7583.9241	0.0000	0.0000	0.0000	0.0000	0.0000	2096.9553	214864.0758
As	0.0000	0.0000	0.0000	0.0000	0.3144	0.0000	0.3847	0.2150	0.6222	0.0000	0.0000	0.0000	0.0000	0.0000	1.5362
B	0.0000	0.0000	26237.4825	16921.2720	1327.4414	907.5954	1246.9956	2208.6293	0.0000	0.0000	0.0000	0.0000	0.0000	681.3287	49530.7449
Ba	0.0000	0.0000	18.5794	39.1051	0.0000	0.0000	0.0000	3.7114	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	61.3959
Be	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Bi	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ca	0.0000	0.0000	287988.2342	169907.1863	9263.5006	6333.6212	9727.6225	18778.2927	0.0000	0.0000	0.0000	0.0000	0.0000	4636.6205	506635.0779
Cd	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Co	0.0000	50.7886	0.0000	0.0000	2.7302	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.8101	55.3290
Cr	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Cu	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Fe	0.0000	0.0000	4760.7788	2375.2553	0.0000	0.0000	0.0000	277.1768	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	7413.2108
K	11781.8797	0.0000	0.0000	1419.6575	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	13201.5372
Mg	0.0000	0.0000	28243.3226	17234.3052	970.4695	663.5274	946.3608	1851.4278	0.0000	0.0000	0.0000	0.0000	0.0000	493.8273	50403.2406
Mn	0.0000	0.0000	115.4489	63.9492	0.0000	0.0000	4.5253	6.7880	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	190.7114
Mo	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Na	9098.2335	5346.4378	11463.6107	7597.0304	548.6677	318.5672	488.2673	827.6674	148.8671	205.4338	148.8671	0.0000	35.7338	318.5672	36545.9510
Ni	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
P	0.0000	0.0000	0.0000	111.4010	14.3861	10.4017	0.0000	0.0000	8.1390	0.0000	0.0000	0.0000	0.0000	13.7957	158.1234
Pb	0.0000	0.0000	35.7058	20.5551	0.0000	0.0000	0.0000	1.6970	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	57.9579
S	20438.5768	11807.2626	3584.8218	1741.2277	240.9182	119.4667	136.4367	164.7201	243.9134	277.8535	311.7935	226.9434	209.9734	142.0934	39646.0012
Sb	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Se	0.0000	0.0000	0.0000	0.0000	0.3723	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.3723
Si	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Sn	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Sr	0.0000	0.0000	4318.1156	2433.7574	176.0641	120.3782	154.3182	273.1082	0.0000	0.0000	0.0000	0.0000	0.0000	97.7515	7573.4931
Te	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	9.0507	0.0000	0.0000	0.0000	9.0507
Ti	0.0000	0.0000	1151.1216	807.2080	46.9243	26.4263	49.0530	77.3363	0.9713	3.7996	2.1026	0.0000	0.0000	32.0830	2197.0261
Tl	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
V	0.0000	0.0000	51.1784	26.4932	0.0000	0.0000	2.6586	2.8849	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	83.2151
Zn	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Zr	138.8480	97.8443	58.5129	41.1844	6.7976	3.9123	5.6659	5.1002	3.0638	3.1204	3.1204	2.3284	3.4598	4.5345	377.4929

Table B4. Size Fractionated Deposition Rates (μg/m^2/day) for Metals in Atmospheric Particulates from Burnaby Lake (May 16-22, 1995)

Sample:	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage CO	Stage L2	Stage L3	Stage L4	Stage L5	Stage LF	Stage BU	Total
Particle Diameter (μm):	>35	21.7	15.7	10.5	6.6	3.3	2.0	1.4	0.9	0.52	0.23	0.11	0.08	<0.08	all fractions
Parameter															
Ag	ND	ND	ND	0.7367	ND	0.1831	0.0915	ND	0.0915	0.1404	ND	0.1831	0.0458	ND	1.4720
Al	ND	ND	5208.8428	75666.2380	11925.9432	11233.3071	65.3295	4.3023	ND	ND	ND	ND	ND	1346.9007	105450.8636
As	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B	ND	ND	2616.5128	27033.2430	4095.8038	4091.5502	63.7550	2.7278	ND	ND	ND	ND	ND	429.9182	38333.5108
Ba	ND	ND	ND	91.1559	11.1734	14.9889	ND	ND	ND	ND	ND	ND	ND	2.7835	120.1017
Be	ND	ND	ND	0.8255	0.1228	0.0965	ND	ND	ND	ND	ND	ND	ND	0.0721	1.1168
Bi	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	ND	ND	15314.0842	192500.7953	28639.8883	29413.1167	364.1695	303.1423	ND	ND	ND	ND	ND	3781.6927	270316.8890
Cd	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	2.1349	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.1349
Cr	ND	ND	ND	78.5783	ND	11.5952	ND	ND	ND	ND	ND	ND	ND	ND	90.1735
Cu	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	ND	ND	ND	2750.2406	435.8686	414.9850	ND	ND	ND	ND	ND	ND	ND	ND	3601.0941
K	ND	ND	4233.0667	1870.1482	285.3577	262.9033	ND	ND	ND	ND	ND	ND	ND	ND	6651.4760
Mg	ND	ND	934.1526	18038.6324	2733.5190	2790.7740	7.9337	1.8309	ND	ND	ND	ND	ND	288.6588	24795.5014
Mn	ND	ND	ND	63.8449	10.6743	9.7644	ND	ND	ND	ND	ND	ND	ND	ND	84.2836
Mo	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	ND	1379.8128	11045.6322	11114.7586	1123.6257	1442.1771	99.5787	343.6875	160.6059	38.5515	404.7147	404.7147	38.5515	343.6875	27940.0986
Ni	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	ND	641.9143	ND	129.5969	ND	13.6630	ND	ND	ND	ND	ND	10.0013	ND	13.0527	808.2283
Pb	ND	ND	ND	18.6623	ND	2.7462	ND	ND	ND	ND	ND	ND	ND	ND	21.4086
S	8965.3085	6360.4509	2062.7598	889.8809	54.4358	104.4763	37.3464	61.7572	214.3252	214.3252	275.3524	269.2497	183.8116	134.9899	19828.4698
Sb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sn	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr	ND	ND	931.6866	2665.8057	411.6801	398.3901	38.3297	38.3297	ND	ND	ND	ND	ND	81.0487	4565.2706
Te	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ti	ND	ND	213.9214	474.9915	68.2420	77.3319	10.2020	10.2020	2.2684	ND	0.4376	1.6582	ND	34.6128	893.8678
Tl	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
V	ND	ND	ND	54.0226	8.0947	8.5438	ND	ND	ND	ND	ND	ND	ND	ND	70.6611
Zn	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zr	ND	ND	53.9536	44.2801	7.0417	9.1640	3.1223	2.9392	2.7561	3.1223	3.4274	3.0613	2.5120	4.2818	139.6619

Table B5. Size Fractionated Deposition Rates (μg/m^2/day) for Metals in Atmospheric Particulates from Burnaby Lake (May 30-June 6, 1995)

Sample:	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage CO	Stage L2	Stage L3	Stage L4	Stage L5	Stage LF	Stage BU	Total
Particle Diameter (μm):	>35	21.7	15.7	10.5	6.6	3.3	2.0	1.4	0.9	0.52	0.23	0.11	0.08	<0.08	all fractions
Parameter															
Ag	22.3503	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	22.3503
Al	ND	ND	43692.7032	51220.8765	5711.5545	3540.8356	4516.4321	3235.9618	ND	ND	ND	ND	ND	5735.9276	117654.2913
As	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B	ND	ND	3904.5829	10849.8448	1252.0124	612.4732	856.3723	673.4480	ND	ND	ND	ND	ND	1222.2210	19370.9545
Ba	ND	ND	ND	42.1353	2.2830	ND	1.5616	ND	ND	ND	ND	ND	ND	4.0006	49.9805
Be	ND	ND	ND	0.7288	0.1142	0.0659	0.0659	ND	ND	ND	ND	ND	ND	0.1086	1.0834
Bi	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	ND	ND	53819.7638	119090.2228	13547.1041	6827.1830	9266.1741	7436.9308	ND	ND	ND	ND	ND	12924.6607	222912.0391
Cd	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	ND	ND	ND	1968.6992	ND	ND	ND	ND	ND	ND	ND	ND	ND	231.7042	2200.4033
K	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mg	ND	ND	6065.8514	12171.4838	1313.1037	654.2595	959.1334	776.2090	ND	ND	ND	ND	ND	1264.0072	23204.0481
Mn	ND	ND	ND	42.3270	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.9999	47.3270
Mo	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	ND	ND	ND	5724.8347	591.1828	221.4427	404.3671	221.4427	99.4932	ND	ND	ND	ND	648.2662	7911.0294
Ni	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pb	ND	ND	ND	11.3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.8292	13.1493
S	3024.5960	3528.5297	ND	891.8023	45.6388	ND	25.1193	ND	134.8739	98.2891	49.5092	43.4118	49.5092	79.9966	7971.2760
Sb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sn	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr	ND	ND	1318.4244	1884.0820	225.3649	123.6614	154.1488	129.7589	ND	ND	ND	ND	ND	196.8312	4032.2716
Te	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ti	ND	ND	ND	574.4521	50.5604	22.3882	28.4856	22.3882	ND	ND	ND	ND	ND	52.8755	751.1499
Tl	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
V	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zn	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zr	ND	ND	ND	23.2122	3.1346	ND	2.4489	ND	ND	ND	ND	ND	ND	3.4855	32.2811

Table B6. Size Fractionated Deposition Rates (µg/m^2/day) for Metals in Atmospheric Particulates from Burnaby Lake (June 13-20, 1995)

Sample:	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage CO	Stage L2	Stage L3	Stage L4	Stage L5	Stage LF	Stage BU
Particle Diameter (µm):	>35	21.7	15.7	10.5	6.6	3.3	2.0	1.4	0.9	0.52	0.23	0.11	0.08	<0.08
Parameter														
Ag	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Al	161955.2926	90536.0540	399223.1011	174056.9103	21145.3404	21538.7664	11222.9718	20249.2921	3292.7048	3034.8099	2261.1253	3292.7048	3744.0208	17025.6063
As	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B	39609.7460	20958.8130	97806.1653	40662.7316	4817.0443	5096.3054	2775.2516	4902.8843	905.5139	776.5664	583.1453	841.0401	969.9876	4064.7259
Ba	ND	82.5182	387.7379	195.7000	20.3470	24.8617	10.0328	23.5723	1.6512	1.6512	ND	1.0065	ND	17.7696
Be	10.1771	5.2853	5.9473	2.3867	0.4134	0.3727	0.2696	0.3276	0.6113	0.3082	0.5919	0.3276	ND	0.1664
Bi	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	402092.7383	213111.1634	966549.8848	433470.3725	48313.9173	50416.3396	26561.0647	47192.6538	7863.6871	7218.9499	5284.7384	7863.6871	3995.2641	41390.0194
Cd	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	2.6423	2.7724	ND	ND	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	ND	ND	10724.8518	4741.2684	603.9625	567.3687	341.7107	548.0266	ND	ND	ND	ND	ND	483.5529
K	ND	ND	4762.3348	2765.5499	ND	374.4613	ND	232.6192	ND	ND	ND	ND	ND	219.7244
Mg	38368.7906	22546.8331	93306.2132	41540.8062	4787.3467	5076.0158	2690.4883	4753.6472	820.7505	691.8031	562.8557	756.2768	433.9082	4044.4363
Mn	319.4112	227.0904	339.3940	135.4648	17.9301	16.1184	10.9605	16.1184	5.9316	7.0921	6.1250	10.9605	5.1579	13.5395
Mo	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	37981.1923	22319.0668	38869.7279	18564.7804	2230.1042	2361.7825	1201.2556	2232.8351	814.4133	685.4659	556.5184	749.9396	169.6762	1845.9928
Ni	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	ND	ND	ND	168.7492	ND	16.3688	ND	14.4346	ND	ND	ND	ND	ND	ND
Pb	ND	ND	81.4546	39.0764	4.2466	4.3842	2.9013	3.8684	ND	ND	ND	ND	ND	3.8684
S	8328.2045	4662.2172	1645.3314	1048.2697	1.1289	97.4818	ND	58.7976	91.0345	123.2713	123.2713	155.5082	ND	58.7976
Sb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	6703.6927	ND	ND	573.1204	ND	ND	ND	70.9211	ND	ND	ND	ND	ND	ND
Sn	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr	7603.0720	4236.1041	12527.8147	5850.0348	682.1072	723.9157	388.6524	659.4420	150.0996	137.2049	111.4154	143.6523	92.0733	562.7314
Te	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ti	ND	ND	498.4624	451.8120	72.3973	30.1202	30.1202	152.6203	ND	ND	2.3965	ND	ND	36.5676
Tl	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
V	ND	ND	55.6606	26.5719	3.6804	3.1592	ND	4.7066	ND	ND	ND	ND	ND	2.8368
Zn	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Table B7. Size Fractionated Deposition Rates (μg/m^2/day) for Metals in Atmospheric Particulates from Burnaby Lake (July 4-11, 1995)

Sample:	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage CO	Stage L2	Stage L3	Stage L4	Stage L5	Stage LF
Particle Diameter (μm):	>35	21.7	15.7	10.5	6.6	3.3	2.0	1.4	0.9	0.52	0.23	0.11	0.08
Parameter													
Ag	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Al	ND	ND	ND	3140.1930	ND	390.2239	555.7952	997.3187	ND	ND	ND	ND	ND
As	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B	ND	ND	ND	908.1038	ND	168.0382	223.2287	333.6095	ND	ND	ND	ND	ND
Ba	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Be	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bi	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	ND	ND	ND	5315.0048	ND	1212.3866	1212.3866	2316.1954	ND	ND	ND	ND	ND
Cd	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
K	ND	ND	ND	ND	ND	171.5302	ND	182.5682	ND	ND	160.4921	ND	182.5682
Mg	ND	ND	ND	768.3392	ND	150.6700	150.6700	261.0509	ND	ND	ND	ND	ND
Mn	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mo	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	ND	ND	ND	ND	ND	90.0548	34.8644	145.2453	ND	ND	ND	ND	200.4357
Ni	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	483.6474	ND	ND	77.2261	12.3787	11.8043	17.8753	10.7005	ND	ND	10.1486	ND	ND
Pb	ND	ND	ND	ND	ND	ND	ND	0.8279	ND	ND	ND	ND	ND
S	6426.8438	418.6825	245.2881	138.5507	ND	11.6983	ND	17.2173	50.3316	39.2935	39.2935	50.3316	177.2696
Sb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	47059.4029	29629.0055	17358.3590	6661.8923	1206.6310	607.0948	662.2853	607.0948	827.8566	827.8566	827.8566	827.8566	772.6661
Sn	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr	ND	ND	ND	323.3571	ND	45.7018	45.7018	62.2590	ND	ND	ND	ND	ND
Te	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ti	ND	ND	ND	12.0673	ND	9.2262	9.2262	9.2262	ND	ND	ND	ND	3.7072
Tl	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
V	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zn	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zr	ND	ND	ND	ND	ND	2.5477	2.3822	2.4373	ND	ND	ND	ND	2.7133

Table B8. Size Fractionated Deposition Rates (μg/m^2/day) for Metals in Atmospheric Particulates from Burnaby Lake (July 11-18, 1995)

Sample:	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage CO	Stage L2	Stage L3	Stage L4	Stage L5	Stage LF	Stage BU
Particle Diameter (μm):	>35	21.7	15.7	10.5	6.6	3.3	2.0	1.4	0.9	0.52	0.23	0.11	0.08	<0.08
Parameter														
Ag	ND	ND	ND	ND	ND	ND	ND	0.1044	ND	ND	ND	ND	ND	ND
Al	ND	ND	26405.3490	600.3390	7.1608	7941.3937	2789.6398	283.3811	ND	ND	ND	ND	ND	7941.3937
As	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
B	ND	ND	7371.5185	25.0667	4.5402	2161.2790	699.2948	72.7301	ND	ND	ND	ND	ND	2022.0424
Ba	ND	ND	ND	ND	ND	10.8333	ND	ND	ND	ND	ND	ND	ND	7.3524
Be	ND	ND	ND	ND	ND	0.0892	0.0892	ND	ND	ND	ND	ND	ND	0.1101
Bi	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	ND	ND	61324.3770	2224.8933	ND	19630.0852	6402.6089	554.6720	ND	ND	ND	ND	ND	18933.9023
Cd	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	ND	ND	ND	ND	ND	320.2442	ND	ND	ND	ND	ND	ND	ND	299.3587
K	17011.6755	ND	ND	ND	ND	ND	209.4097	ND	ND	195.4860	ND	ND	ND	251.1806
Mg	ND	ND	6911.6721	353.3074	23.3625	1860.8972	677.3862	50.8215	ND	ND	ND	ND	ND	1860.8972
Mn	ND	ND	ND	ND	ND	7.6580	ND	ND	ND	ND	ND	ND	ND	7.6580
Mo	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.8290
Na	6925.7347	6563.9959	2384.3218	ND	ND	1088.2530	252.8335	113.5969	252.8335	322.4518	183.2152	ND	183.2152	949.0165
Ni	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	822.9307	ND	370.9847	ND	17.6622	24.6368	ND	ND	21.8520	19.7635	14.1940	10.0169	21.8520	16.9787
Pb	ND	ND	ND	ND	ND	2.0885	1.0443	ND	0.5221	0.5221	1.6012	ND	ND	2.6455
S	12359.7174	9008.9346	1186.4727	ND	ND	223.6114	ND	ND	244.4968	335.0006	223.6114	ND	195.7640	91.3366
Sb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	63666.9465	37412.9075	20457.3713	8412.0528	1523.6277	974.6561	1044.2744	1044.2744	974.6561	1044.2744	1044.2744	1113.8927	1044.2744	1044.2744
Sn	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr	ND	ND	1648.3892	296.1463	ND	287.3895	120.3056	43.7255	ND	ND	ND	ND	ND	273.4659
Te	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ti	ND	142.5951	244.2768	ND	ND	116.0656	18.6000	ND	4.6763	18.6000	ND	ND	ND	95.1801
Tl	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
V	ND	ND	ND	ND	ND	3.2721	ND	ND	ND	ND	ND	ND	ND	3.3417
Zn	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zr	166.2238	97.6789	57.2258	ND	ND	7.6693	3.0745	3.6315	4.8150	6.2770	3.7011	ND	2.7960	5.3023

Table B9. Size Fractionated Deposition Rates (µg/m^2/day) for Metals in Atmospheric Particulates from Burnaby Lake (July 25 - August 1, 1995)

Sample:	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage CO	Stage L2	Stage L3	Stage L4	Stage L5	Stage LF
Particle Diameter (µm):	>35	21.7	15.7	10.5	6.6	3.3	2.0	1.4	0.9	0.52	0.23	0.11	0.08
Parameter													
Ag	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Al	ND	ND	30458.3013	9473.2366	3939.0435	1193.7100	2255.8487	1911.1812	ND	ND	ND	ND	ND
As	ND	ND	ND	3.8358	ND	ND	ND	0.3165	ND	0.3693	ND	ND	0.4220
B	ND	ND	5544.6950	2184.8017	920.6453	347.8116	432.2199	382.9817	ND	ND	ND	ND	ND
Ba	ND	ND	ND	ND	0.6804	ND	1.0277	0.6057	ND	ND	ND	ND	ND
Be	ND	ND	1.6004	0.6142	0.1267	0.0760	0.0866	0.1182	0.0866	ND	ND	ND	0.0760
Bi	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	ND	ND	79908.2861	24416.7689	9671.7166	3092.6756	5835.9475	4921.5235	ND	ND	ND	ND	ND
Cd	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
K	ND	9801.0722	ND	ND	344.5943	242.5312	ND	293.1762	ND	ND	ND	ND	ND
Mg	ND	ND	8632.3608	2631.0615	1032.3517	318.6417	607.0370	522.6286	ND	ND	ND	ND	ND
Mn	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mo	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	ND	332.8813	6413.8720	1325.0261	497.3104	185.1153	410.2043	339.8640	ND	ND	ND	ND	ND
Ni	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	ND	421.7764	331.4993	103.9259	ND	10.8945	14.2005	16.4514	14.2005	ND	ND	ND	ND
Pb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
S	3191.1249	6550.8552	1705.6865	200.0075	67.1041	34.6048	90.1736	73.2920	148.5561	84.5464	109.1655	117.6064	12.7993
Sb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sn	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr	ND	ND	1892.4186	635.3613	186.0986	80.0525	118.0363	104.6717	ND	ND	ND	ND	ND
Te	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	10.9027	12.9426	ND
Ti	ND	ND	780.5707	185.9193	65.5817	27.2337	53.9630	47.6324	ND	ND	ND	ND	ND
Tl	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
V	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zn	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zr	ND	123.9992	67.1673	28.2214	5.4307	4.6328	4.9141	5.0197	4.0349	ND	ND	3.0783	ND

Table B10. Size Fractionated Deposition Rates (µg/m^2/day) for Metals in Atmospheric Particulates from Burnaby Lake (August 8-14, 1995)

Sample:	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage CO	Stage L2	Stage L3	Stage L4	Stage L5	Stage LF	Stage BU	Total
Particle Diameter (µm):	>35	21.7	15.7	10.5	6.6	3.3	2.0	1.4	0.9	0.52	0.23	0.11	0.08	<0.08	all fractions
Parameter															
Ag	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Al	ND	ND	ND	9016.2998	ND	ND	6186.5823	3165.1966	ND	ND	ND	ND	ND	303.5623	18671.6410
As	ND	ND	ND	5.8910	ND	ND	ND	0.3126	ND	0.6251	ND	ND	ND	ND	6.8287
B	ND	ND	ND	3166.9391	ND	ND	1489.4874	850.4817	ND	ND	ND	ND	ND	10.0503	5516.9586
Ba	ND	ND	ND	ND	ND	ND	6.0852	4.9044	ND	ND	ND	ND	ND	ND	10.9896
Be	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bi	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	ND	ND	ND	23545.6327	ND	ND	16320.1595	7985.3024	ND	ND	ND	ND	ND	1039.5881	48890.6826
Cd	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	ND	ND	ND	ND	ND	ND	272.9666	ND	ND	ND	ND	ND	ND	ND	272.9666
K	ND	ND	ND	ND	ND	ND	231.8458	192.2552	ND	ND	ND	ND	ND	ND	424.1010
Mg	ND	ND	ND	2485.4381	ND	ND	1599.5981	807.7867	ND	ND	ND	ND	ND	113.2153	5006.0382
Mn	ND	ND	ND	ND	ND	ND	6.6123	ND	ND	ND	ND	ND	ND	ND	6.6123
Mo	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	ND	328.6538	ND	1083.7798	155.6512	ND	856.5254	516.1854	ND	ND	57.7682	ND	ND	29.9854	3028.5491
Ni	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	ND	588.5939	ND	ND	22.6492	ND	14.2306	ND	13.1888	ND	11.5218	14.5084	ND	ND	664.6927
Pb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
S	10539.1664	10010.9513	90.5814	416.2756	159.7416	4.3037	102.2383	150.8583	141.8289	126.5483	257.8223	234.2069	150.8583	46.6726	22432.0539
Sb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	ND	16.8431	ND	ND	ND	ND	ND	ND	ND	ND	0.3647	0.3126	0.4688	0.6772	18.6664
Si	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	109.0477	ND	109.0477
Sn	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr	ND	ND	ND	616.0714	ND	ND	238.1043	146.4209	ND	ND	ND	ND	ND	50.5700	1051.1665
Te	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ti	ND	ND	ND	161.1162	35.2792	2.4429	90.7924	67.1769	ND	ND	ND	ND	ND	13.0004	369.8080
Tl	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
V	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zn	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zr	178.1855	156.6097	51.6955	36.8397	8.6541	2.8799	6.0610	8.0683	4.2273	3.3036	4.6441	4.4774	3.6647	3.3869	472.6978

Table B11. Size Fractionated Deposition Rates (µg/m^2/day) for Metals in Atmospheric Particulates from Burnaby Lake (August 22-29, 1995)

Sample:	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage CO	Stage L2	Stage L3	Stage L4	Stage L5	Stage LF	Stage BU
Particle Diameter (µm):	>35	21.7	15.7	10.5	6.6	3.3	2.0	1.4	0.9	0.52	0.23	0.11	0.08	<0.08
Parameter														
Ag	ND	ND	ND	ND	0.0576	ND	ND	ND	ND	ND	ND	ND	ND	ND
Al	77886.9467	39923.1227	186789.6698	73383.2606	11448.3400	10925.1025	10661.3010	9764.3758	1317.4511	784.5720	1291.0709	2383.2092	1670.9451	7073.6003
As	12.0342	ND	6.6288	3.1801	0.5184	0.3957	0.3561	0.3957	0.1979	0.1979	0.2374	0.1979	0.3166	0.3561
B	23890.9309	9701.8222	57057.2406	22872.9788	3712.7839	3152.1484	3210.1848	2909.4510	434.9928	245.0557	440.2688	851.7992	514.1332	2107.4944
Ba	377.4260	70.9254	337.6394	140.1814	22.7791	17.7069	19.7646	18.3928	9.7401	5.8358	5.8886	10.3205	9.5818	12.9585
Be	ND	ND	ND	0.4922	0.1060	0.0929	0.0929	0.0850	ND	ND	ND	ND	ND	0.0570
Bi	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	205278.8589	99885.2873	430837.2539	168741.2975	26953.6455	25164.9416	24584.5782	22579.6866	3427.6962	2003.1680	3163.8946	5854.6702	4219.1007	16670.5326
Cd	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	ND	ND	5943.8426	2281.1626	374.7750	305.4822	316.0342	294.4025	ND	ND	ND	ND	ND	232.1453
K	ND	ND	ND	1686.6902	211.0389	ND	190.3575	150.2597	ND	ND	ND	ND	ND	ND
Mg	20634.6500	10428.4251	44446.2452	17354.6448	2736.3186	2555.1816	2512.9734	2317.7603	349.8009	217.9002	339.2489	603.0504	444.7695	1689.9127
Mn	ND	ND	148.0437	57.2411	9.3694	7.9668	8.0723	7.5975	ND	ND	ND	ND	ND	6.2257
Mo	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	16789.1879	6471.4867	19037.6532	7051.9768	1169.7673	977.7387	1025.2230	946.0825	223.2663	112.4697	138.8498	339.3390	276.0266	671.7289
Ni	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	628.6132	ND	160.0676	64.3997	19.5746	13.2894	17.0354	7.7496	ND	ND	ND	ND	ND	ND
Pb	ND	ND	43.0873	17.8083	2.4191	2.4534	2.6908	2.5325	1.3876	ND	ND	ND	ND	2.4164
S	6552.9032	1625.4806	2863.6091	704.6853	105.3642	52.3362	73.9680	76.0784	37.0358	9.0728	10.6556	67.1091	29.1217	41.7842
Sb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	3786.7619	1663.2672	1425.1965	491.8492	93.6938	55.9259	67.0056	52.2327	61.2020	60.6743	54.3431	56.4535	65.9504	78.6129
Sn	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr	3941.0404	2051.8814	6140.5804	2386.3483	381.5390	342.3128	339.6748	315.9327	66.9040	47.9103	62.1556	97.5050	76.4009	236.2646
Te	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ti	1370.8426	390.6808	1510.4551	571.2111	87.3326	69.4943	82.6844	76.8808	20.9549	7.2372	5.6544	25.1757	24.1205	50.5006
Tl	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
V	ND	ND	108.9336	46.6409	6.6891	5.2655	5.4343	4.8592	ND	ND	ND	2.1262	ND	4.0942
Zn	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zr	243.1310	85.9213	149.3280	56.4620	9.9962	5.8122	7.7643	7.0257	4.6198	3.2164	2.8524	5.2318	4.3402	4.9680

Table B12. Size Fractionated Deposition Rates (µg/m^2/day) for Metals in Atmospheric Particulates from Burnaby Lake (Oct 3-10, 1995)

Sample:	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage CO	Stage L2	Stage L3	Stage L4	Stage L5	Stage LF	Stage BU	Total
Particle Diameter (µm):	>35	21.7	15.7	10.5	6.6	3.3	2.0	1.4	0.9	0.52	0.23	0.11	0.08	<0.08	all fractions
Parameter															
Ag	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Al	ND	ND	97711.9879	71885.5158	ND	ND	ND	1478.3215	ND	ND	ND	ND	ND	264.9422	171340.7674
As	ND	ND	5.0146	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.0146
B	ND	ND	28810.1946	19473.5810	ND	ND	ND	396.7114	ND	ND	ND	ND	ND	110.8367	48791.3236
Ba	ND	ND	118.4924	77.2947	ND	ND	ND	ND	1.1823	ND	ND	ND	ND	ND	196.9694
Be	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bi	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ca	ND	ND	258041.5089	184738.6685	ND	ND	ND	3301.3656	385.4437	ND	ND	ND	ND	753.9044	447220.8910
Cd	ND	11.9832	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	11.9832
Co	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fe	ND	ND	ND	2555.7835	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2555.7835
K	16150.5744	ND	4289.7888	1507.7936	ND	ND	ND	195.5363	ND	ND	ND	ND	ND	ND	22143.6931
Mg	ND	ND	24243.9643	17875.0893	ND	ND	ND	344.9556	2.5412	ND	ND	ND	ND	52.7281	42519.2786
Mn	ND	237.3819	121.6878	64.1512	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	423.2209
Mo	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Na	28866.5931	72.3796	18228.7183	10331.7858	300.4028	ND	ND	287.8892	192.5976	ND	268.8309	ND	ND	ND	58549.1974
Ni	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P	1261.9269	609.1660	312.7556	127.7293	ND	ND	ND	ND	14.7945	ND	15.1122	ND	ND	ND	2341.4844
Pb	ND	ND	30.0877	13.0868	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	43.1745
S	18613.1622	4249.9627	4509.0860	1284.0310	89.4190	ND	ND	12.1949	127.1801	ND	126.5448	24.9005	11.5597	45.2293	29093.2703
Sb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Si	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sn	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr	ND	ND	3821.9007	2482.9462	ND	ND	ND	71.6640	32.9121	ND	ND	ND	ND	41.8060	6451.2291
Te	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ti	727.0176	358.7452	1493.9132	891.5326	6.2438	ND	ND	3.1872	22.6902	ND	11.2553	ND	ND	9.9847	3524.5700
Tl	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
V	ND	ND	60.4428	26.1224	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	86.5651
Zn	6797.4309	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6797.4309
Zr	183.9676	95.7802	81.7883	37.8043	3.8448	ND	ND	ND	2.7230	ND	3.4281	ND	ND	ND	409.3362

Table B13. Mean Size Fractionated Deposition Rates (µg/m^2/day) for Metals in Dry Atmospheric Particulates from Burnaby Lake (April 11 - October 10, 1995) (n=11)

Sample:	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	Stage 7	Stage CO	Stage L2	Stage L3	Stage L4	Stage L5	Stage LF
Particle Diameter (µm):	>35	21.7	15.7	10.5	6.6	3.3	2.0	1.4	0.9	0.52	0.23	0.11	0.08
Parameter													
Ag	3.4550	1.3369	2200.6360	50.0896	0.6101	661.8294	232.4946	23.6238	0.0342	0.0117	0.0154	0.0153	0.0373
Al	19987	10872	83282	48941	5500	5233	3867	4237	384	318	296	473	451
As	49.7526	2.4827	637.6409	6.7715	0.8833	180.1396	58.3363	7.1738	0.1587	0.0994	0.0198	0.0165	0.0616
B	5292	2555	21131	13041	1500	1443	1007	1109	112	85	85	141	124
Ba	31.4522	12.7870	71.8708	50.3268	4.8933	5.7067	3.2134	4.2655	1.0478	0.6239	0.4907	0.9439	0.7985
Be	0.8481	0.4404	0.6290	0.4206	0.0736	0.0661	0.0503	0.0442	0.0582	0.0257	0.0493	0.0273	0.0063
Bi	ND	ND	5110	185	ND	1636	534	46	ND	ND	ND	ND	ND
Ca	50614	26083	197604	120290	12937	12489	9164	10050	973	769	704	1143	685
Cd	ND	0.9986	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co	ND	4.2324	ND	ND	0.6256	0.2310	ND	ND	ND	ND	ND	ND	ND
Cr	ND	ND	ND	6.5482	ND	0.9663	ND	ND	ND	ND	ND	ND	ND
Cu	ND	ND	ND	ND	ND	26.6870	ND	ND	ND	ND	ND	ND	ND
Fe	1418	ND	1786	1574	147	134	115	93	ND	16	ND	ND	ND
K	5438	817	1997	800	72	243	156	108	ND	16	13	ND	15
Mg	4917	2748	19604	11890	1294	1241	935	1015	98	76	75	113	73
Mn	98.1172	38.7060	69.1084	39.7038	3.8489	3.4590	4.7461	2.5420	0.4943	0.5910	0.5104	0.9134	0.4298
Mo	577	547	199	ND	ND	91	21	9	21	27	15	ND	15
Na	8835	4452	10143	5861	642	598	476	533	177	133	166	133	75
Ni	68.5776	ND	30.9154	ND	1.4719	2.0531	ND	ND	1.8210	1.6470	1.1828	0.8347	1.8210
P	329.4382	188.4542	97.9423	65.2524	8.4177	8.5956	5.3655	4.8759	7.5666	1.6905	5.1992	2.8772	2.7450
Pb	1035.5014	759.7206	120.5521	12.6618	0.8899	19.9949	0.5530	0.7438	20.5339	28.2791	18.7677	ND	16.3137
S	9605	5484	1627	705	77	57	76	62	144	126	144	119	97
Sb	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Se	5306	3119	1705	701	127	81	87	87	81	87	87	93	87
Si	10101	5725	3270	1345	235	136	148	148	155	161	161	167	166
Sn	ND	ND	137.3658	24.6789	ND	23.9491	10.0255	3.6438	ND	ND	ND	ND	ND
Sr	962	524	3011	1783	196	188	147	162	21	15	14	20	14
Te	ND	11.8829	20.3564	ND	ND	9.6721	1.5500	ND	0.3897	1.5500	1.6628	1.0786	ND
Ti	174.8217	81.4340	599.2740	407.1938	45.1246	35.8041	37.2962	42.4328	5.1851	2.5610	2.0181	2.2743	2.3190
Tl	ND	ND	ND	ND	ND	0.2727	ND	ND	ND	ND	ND	ND	ND
V	ND	ND	23.0179	14.9876	1.5387	1.6867	0.6744	1.0376	ND	ND	ND	0.1772	ND
Zn	580.3046	8.1399	4.7688	ND	ND	0.6391	12.4783	0.3026	0.4012	0.5231	0.3084	ND	0.2330
Zr	99.1262	69.2123	54.7083	28.4471	4.7026	3.6429	3.8598	3.5178	2.8154	2.0449	2.2214	1.9838	2.0159