The Fairbanks, Alaska $PM_{2.5}$ Source Apportionment Research Study Winters 2005/2006-2012/2013, and Summer 2012

Final Report

Amendments 6 and 7

December 23, 2013

by

Tony J. Ward, Ph.D.

University of Montana – Missoula
Center for Environmental Health Sciences

Skaggs Building 176
Missoula, MT 59812
Office: (406) 243-4092
Fax: (406) 243-2807

1.0. Executive Summary

Fairbanks, Alaska has some of the highest measured ambient $PM_{2.5}$ (particulate matter less than or equal to 2.5 microns in diameter) concentrations in the United States, with wintertime levels often exceeding the 24-hour $PM_{2.5}$ National Ambient Air Quality Standard (NAAQS) of 35 µg/m^3. In an effort to understand the sources of $PM_{2.5}$ in the Fairbanks airshed, source apportionment using Chemical Mass Balance (CMB) modeling was conducted at multiple locations throughout Fairbanks each winter between 2005/2006 and 2012/2013. $PM_{2.5}$ source apportionment was also conducted at the NCORE and State Building sites during the summer of 2012 for comparison. Modeling for each of the sites/years was conducted using source profiles from both the Environmental Protection Agency (EPA) as well as Fairbanks-specific profiles developed by OMNI Environmental Services (OMNI).

Throughout the program, wintertime $PM_{2.5}$ average concentrations ranged from 8.2 µg/m^3 (RAMS, winter 2008/2009) up to 46.9 µg/m^3 (NPF3, winter 2012/2013), with many of the sites having frequent exceedances of the 24-hour NAAQS on the scheduled sample days. The results of the CMB modeling using source profiles developed by the EPA revealed that wood smoke (likely residential wood combustion) was the major source of $PM_{2.5}$ throughout the winter months in Fairbanks, contributing between ~60% to over 80% of the measured $PM_{2.5}$ depending on site and winter / year. The other sources of $PM_{2.5}$ identified by the CMB model were secondary sulfate (~7-21%), ammonium nitrate (3-11%), diesel exhaust (not detected-11%), and automobiles (not detected-7%). Approximately 1-2% of the ambient $PM_{2.5}$ was unexplained.

When conducting CMB modeling with Fairbanks-specific space heater source profiles developed by OMNI, final results were somewhat similar to the sources identified using EPA profiles. Consistent with the EPA modeling, wood smoke was identified as being a large source of $PM_{2.5}$ at the majority of the sampling sites, contributing from 30% to 77% to the ambient wintertime $PM_{2.5}$. In addition, the OMNI profile for No. 2 fuel oil combustion was frequently identified during the winter months, contributing anywhere from 10% to 47% to the ambient $PM_{2.5}$ throughout the winter months at each of the sites. Combustion of No. 2 fuel oil (and contribution to ambient $PM_{2.5}$) was determined to be especially high at the State Building and Peger Road sites.

Summer source apportionment revealed that ambient levels of $PM_{2.5}$ were very low at both the State Building and NCORE sites (~5.5 µg/m^3). CMB modeling using both the EPA and OMNI profiles identified wood smoke as the predominant source during the summer months, likely from residential outdoor biomass waste burning and regional controlled/wildfires. In summary, CMB modeling results using both the EPA and OMNI profiles support that residential home heating (residential wood stoves and heating with No. 2 fuel oil) are the major contributors to the ambient $PM_{2.5}$ in the Fairbanks airshed during the winter months. Wood smoke was also consistently identified during the summer months, albeit at much lower concentrations compared to winter concentrations.

2.0. Overview

The primary objective of this research study was to identify the major sources of ambient $PM_{2.5}$ in Fairbanks, Alaska using both EPA and OMNI (Fairbanks-specific) source profiles in a CMB model. Specifically, source apportionment was conducted for the following time periods/locations:

Winter 2005/2006: State Building.
Winter 2006/2007: State Building.
Winter 2007/2008: State Building.
Winter 2008/2009: State Building, North Pole, RAMS, Peger Road.
Winter 2009/2010: State Building, North Pole, RAMS, Peger Road.
Winter 2010/2011: State Building, North Pole, Peger Road.
Winter 2011/2012: State Building, NCORE, RAMS, North Pole, NPF3.
Summer 2012: State Building, NCORE.
Winter 2012/2013: State Building, NCORE, NPF3, NPE.

Within this report, the sampling, analytical, and computer modeling methodologies are described in Sections 3.0 through 5.0, respectively. Sections 6.0 and 7.0 present the results of the $PM_{2.5}$ sampling and CMB modeling program (using both EPA and OMNI source profiles), respectively, while Section 8.0 provides a discussion of all of the CMB modeling findings. Section 9.0 presents the results of the Quality Assurance / Quality Control (QA/QC) program. In Appendix A, the eight source profiles developed from the OMNI emissions testing are displayed, while Appendix B contains a listing of sample days excluded from CMB modeling. Finally, Appendix C presents the CMB results for each sample day (per site and season) using both EPA and OMNI profiles.

3.0. $PM_{2.5}$ Sampling Program

3.1. Sampling Program Experimental Method

For each of the winter sampling programs (November-March), $PM_{2.5}$ sampling was typically conducted every three days following the EPA's fixed monitoring schedule. For the winters of 2005/2006, 2006/2007, and 2007/2008, sampling was conducted at the State Building site. $PM_{2.5}$ sampling was conducted at the State Building, North Pole, and Peger Road (also known as the Transit Yard) sites during the winters of 2008/2009, 2009/2010, and 2010/2011, respectively. A Relocatable Air Monitoring System (RAMS) collected $PM_{2.5}$ samples only during the winters of 2008/2009, 2009/2010, and 2011/2012. From January 14-March 19, 2009, the mobile RAMS was located at the Reindeer Site (i.e. University of Alaska Fairbanks Experimental Farm property between the Parks Highway and Geist Rd). From March 19 through the end of the program, the mobile RAMS was located at Woodriver Elementary School (Palo Verde Ave/ Univ. West). In this report, results for the Reindeer and Elementary School sites are presented as one location (i.e. the "RAMS Site").

In addition to the RAMS site, samples were also collected every three days at four additional sites (State Building, NCORE, North Pole, and NPF3) during the winter 2011/2012. For the winter of 2012/2013, the RAMS and North Pole sites were discontinued while the NPE site was added. Finally, $PM_{2.5}$ samples were collected at two locations during the summer of 2012 (State Building and NCORE) for a site comparison, as well as providing a comparison for summer results with winter results.

At each of the sites, 24-hour $PM_{2.5}$ sampling was conducted using a MetOne (Grants Pass, OR) Spiral Ambient Speciation Sampler (SASS). During each 24-hour sampling event at each of the sites, the SASS collected ~9.7 m^3 of air through Teflon, nylon, and quartz filter media, respectively (flow rate of 6.7 liters per minute (LPM)). Starting in the winter of 2009/2010, a URG 3000N Sequential Particulate

Speciation System was used to collect sample on a quartz filter at the State Building site for organics analyses. During each 24-hour event the URG collected air sample at a flow rate of 22.0 LPM.

3.2. Sampling Program Quality Assurance / Quality Control (QA/QC)

A stringent Quality Assurance / Quality Control (QA/QC) program was employed throughout this study. Prior to sampling, clean filters (Teflon, nylon, and quartz) were provided by Research Triangle Institute (RTI, Research Triangle Park, NC). Following the sampling events, exposed Teflon and nylon filters were sent back to RTI for laboratory analyses, while the exposed quartz filters were sent to Desert Research Institute (Reno, NV). During shipment of both clean and exposed filter sample media, all $PM_{2.5}$ filters remained in their protective containers and were FedEx overnighted in a cooler containing cold packs during transport.

Throughout the sampling program, the air samplers were maintained by Fairbanks North Star Borough (FNSB) Air Quality staff, with support from Alaska Department of Environmental Conservation (ADEC) staff. During each sampling event (24-hour period), the filters were subjected to temperatures that did not exceed the ambient temperature by more than five °C for more than 30 minutes continuously. Fairbanks site personnel removed the exposed filters from the samplers within 48 hours after the episode ended, and refrigerated the exposed filters immediately upon collection. The air samplers were also audited with an independent transfer standard during the program to verify the accurate measurement of air flow rates, ambient/filter temperatures, and barometric pressures. In addition, $PM_{2.5}$ filter field blanks were collected periodically throughout the program in an effort to determine any artifact contamination.

4.0. Analytical Program

4.1. $PM_{2.5}$ Speciation Data

The Met One Super SASS located at each of the sites collected ambient $PM_{2.5}$ on Teflon, nylon, and quartz filter media, respectively. The majority of the exposed SASS filter samples were analyzed by RTI. From the Teflon filter, a gravimetric analysis (RTI, 2008) was initially performed followed by an elemental analysis (RTI, 2009a) using energy-dispersive X-ray fluorescence (EDXRF) where 31 elements were quantified. From the nylon filter, ions (including ammonium, potassium, sodium, nitrate, and sulfate) were measured by ion chromatography (IC) (RTI, 2009b; RTI, 2009c). Depending on the site and year, quartz filters were either analyzed by RTI for Elemental Carbon and Organic Carbon (EC/OC) concentrations using Thermal Optical Transmittance (RTI, 2009d), or by Desert Research Institute using the IMPROVE_A method (Chow et al., 2007). Following the analyses, sample results (including analyte concentrations and uncertainties) were provided to the University of Montana for use in the CMB source apportionment model.

4.2. Analytical Program QA/QC

RTI and the Desert Research Institute were responsible for QA/QC activities within their laboratories.

5.0. Computer Modeling Program

In this project, the most recent version of the Chemical Mass Balance (CMB) computer model (Version 8.2) was utilized to apportion the sources of $PM_{2.5}$ in Fairbanks. The CMB receptor model (Friedlander, 1973; Cooper and Watson, 1980; Gordon, 1980, 1988; Watson, 1984; Watson et al., 1984; 1990; Hidy and Venkataraman, 1996) is based on an effective-variance least squares method, and consists of a solution to linear equations that expresses each receptor chemical concentration as a linear sum of products of source fingerprint abundances and contributions.

For each sample day (from the multiple sites), the CMB modeling process began by selecting from a combination of 91 sources (**see Table 1**) and 43 chemical species (36 elements, 5 ions, OC and EC, **Table 5**) in an effort to reconstruct the measured Fairbanks ambient $PM_{2.5}$ mass and chemical composition. As part of the CMB modeling procedure, multiple combinations would be tried for each sample run in an effort to select the best combination of sources and species, with an evaluation of the diagnostic performance measures conducted each time until an optimal fit could be obtained. The resulting output file contained the source contribution estimate (SCE) of each identified source, along with the associated standard errors (STD ERR). Unexplained concentrations were also calculated by taking the difference between the actual measured mass and the CMB predicted mass for each sample run.

5.1. CMB Model EPA Source Profiles

Discussions were held with Sierra Research, FNSB, and ADEC in an effort to identify all of the potential sources of $PM_{2.5}$ in Fairbanks prior to setting up the CMB model. Following these discussions, a comprehensive list of sources that could potentially contribute $PM_{2.5}$ to the Fairbanks airshed was developed. For each identified source, an attempt was made to locate a source profile. Source profiles are the fractional mass abundances of measured chemical species relative to primary $PM_{2.5}$ mass in source emissions, and are part of the input data loaded into the CMB model. Source profiles represent a general source category rather than any local, individual, $PM_{2.5}$ emission source.

The source profiles listed in **Table 1** (known throughout this report as "EPA Source Profiles") were either taken directly from the most recent version of SPECIATE 4.0 (USEPA, 2006) or from previous Missoula Valley (Montana) CMB applications (Carlson, 1990; Schmidt, 1996; Ward and Smith, 2005). SPECIATE 4.0 is EPA's repository of Total Organic Compound (TOC) and Particulate Matter (PM) speciated source profiles for use in source apportionment studies. For each source found in the database, both the compound fraction and uncertainty for the source-specific compounds are presented. The profiles in **Table 1** are listed together as source groups, and can be broken down into profiles for street sand and road dust (Profiles 1- 6), pure secondary source emissions (Profiles 7-9), gasoline and diesel exhaust emissions (Profiles 10 – 40), tire and brake wear (Profiles 41 - 48), meat cooking (Profiles 49 - 53), residential wood combustion (Profiles 54 – 78), and other local sources / industry in Fairbanks (Profiles 79-91). Multiple source profiles for each source were used because source compositions can vary substantially among sources, even within a single source over an extended period of time.

Since Missoula and Fairbanks have similar topographies (i.e. valley locations impacted by temperature inversions, cold winter temperatures, etc.) and many of the same sources of $PM_{2.5}$, several of the CMB source profiles developed in past Missoula CMB applications were included in the Fairbanks $PM_{2.5}$ source apportionment program. These include profiles for street sand (Profiles 1), secondary sulfate (Profile 7), secondary ammonium sulfate (Profile 8), secondary ammonium nitrate (Profile 9), diesel train (Profile 39) and diesel truck exhaust (Profile 40), and residential wood combustion (Profile 56). All SPECIATE and Missoula CMB profiles used in the Fairbanks CMB were reviewed before being loaded into the CMB model. For those chemical species known to be absent from specific source types, default values of zero for the mass fraction and uncertainty of 0.0001 were used.

One assumption of the CMB model is that compositions of source emissions are constant over the period of ambient and source sampling, and that chemical species do not react with each other. CMB is well suited for apportioning sources of primary aerosols (those emitted directly as particles). However, it is difficult to attribute secondary aerosols formed through gas-to-particle transformation in the atmosphere to specific sources. Sulfate, nitrate, and ammonium abundances in directly emitted particles are not sufficient to account for the concentrations of these species measured in the atmosphere. Therefore, to

account for secondary aerosol contributions to $PM_{2.5}$ mass, sulfate (Profile 7), ammonium sulfate (Profile 8), and ammonium nitrate (Profile 9) were expressed as "pure" secondary source profiles, and represented by their chemical form.

Table 1: $PM_{2.5}$ Source Profiles ("EPA Profiles") Used in the Fairbanks CMB.

Profile	Description
1	CITY STREET SANDING PILE, STREET SAND
2	SPECIATE 411302.5, PAVED ROAD DUST – COMPOSITE
3	SPECIATE 412202.5, UNPAVED ROAD DUST – COMPOSITE
4	SPECIATE 92053, PAVED ROAD DUST – SIMPLIFIED
5	SPECIATE 92088, UNPAVED ROAD DUST – SIMPLIFIED
6	SPECIATE 92073, SAND & GRAVEL – SIMPLIFIED
7	SULFATE (SO4 IS ONLY SPECIE, THEREFORE IS ONLY NONZERO CONCENTRATION)
8	AMMONIUM SULFATE (INCLUDES NH4)
9	AMMONIUM NITRATE (INCLUDES NH4)
10	SPECIATE 311052.5 LIGHT DUTY VEHICLE-LEADED COMPOSITE
11	SPECIATE 312022.5 LIGHT DUTY VEHICLE-UNLEADED
12	SPECIATE 321022.5 LIGHT DUTY VEHICLE-DIESEL
13	SPECIATE 321032.5 LIGHT DUTY VEHICLE-DIESEL (2ND PROFILE OF THIS TYPE)
14	SPECIATE 322032.5, HEAVY DUTY VEHICLE-DIESEL
15	SPECIATE 311082.5, LIGHT DUTY VEHICLE - NON CATALYST
16	SPECIATE 311072.5, LIGHT DUTY VEHICLE - WITH CATALYST
17	SPECIATE 322022.5, HEAVY DUTY DIESEL
18	SPECIATE 322082.5, HEAVY DUTY DIESEL TRUCKS
19	SPECIATE 312012.5, LIGHT DUTY VEHICLE – UNLEADED
20	SPECIATE 312032.5, LIGHT DUTY VEHICLE – UNLEADED
21	SPECIATE 3875, GASOLINE EXHAUST - WINTER, SMOKER
22	SPECIATE 3884, GASOLINE EXHAUST - WINTER, LOW EMITTER PROFILE 1
23	SPECIATE 3888, GASOLINE EXHAUST - WINTER, LOW EMITTER PROFILE 2
24	SPECIATE 3892, GASOLINE EXHAUST - WINTER, HIGH EMITTER PROFILE 1
25	SPECIATE 3896, GASOLINE EXHAUST - WINTER, HIGH EMITTER PROFILE 2
26	SPECIATE 3900, GASOLINE EXHAUST - WINTER, NON-SMOKER
27	SPECIATE 3904, GASOLINE EXHAUST - WINTER, SMOKER PROFILE 1
28	SPECIATE 3908, GASOLINE EXHAUST - WINTER, SMOKER PROFILE 2
29	SPECIATE 3878, DIESEL EXHAUST PROFILE 1
30	SPECIATE 3879, DIESEL EXHAUST PROFILE 2
31	SPECIATE 3880, DIESEL EXHAUST PROFILE 3
32	SPECIATE 3912, DIESEL EXHAUST PROFILE 4
33	SPECIATE 3913, DIESEL EXHAUST PROFILE 5
34	SPECIATE 3914, DIESEL EXHAUST PROFILE 6
35	SPECIATE 92035, HDDV EXHAUST – SIMPLIFIED
36	SPECIATE 92042, LDDV EXHAUST – SIMPLIFIED
37	SPECIATE 92049, NON-CATALYST GASOLINE EXHAUST – SIMPLIFIED
38	SPECIATE 92050, ONROAD GASOLINE EXHAUST – SIMPLIFIED
39	DIESEL TRAIN (SENT FROM MISSOULA)
40	DIESEL TRUCK (SENT FROM MISSOULA)
41	SPECIATE 340022.5, TIRE WEAR PROFILE 1
42	SPECIATE 340032.5, TIRE WEAR PROFILE 2
43	SPECIATE 340082.5, TIRE WEAR PROFILE 3
44	SPECIATE 3156, TIRE WEAR PROFILE 4

45	SPECIATE 92087, TIRE DUST – SIMPLIFIED
46	SPECIATE 340042.5, BRAKE LINING – ASBESTOS
47	SPECIATE 3157, BRAKE WEAR
48	SPECIATE 92009, BRAKE LINING DUST – SIMPLIFIED
49	SPECIATE 160002.5, MEAT COOKING – CHARBROILING
50	SPECIATE 160012.5, MEAT COOKING – FRYING
51	SPECIATE 4383, COOKING
52	SPECIATE 91005, COOKING - CHARBROILING COMPOSITE
53	SPECIATE 92015, CHARBROILING – SIMPLIFIED
54	SPECIATE 421042.5 RESIDENTIAL WOOD SMOKE FROM MEDFORD, OR
55	SPECIATE 421052.5 RESIDENTIAL WOOD SMOKE FROM POCATELLO, ID
56	RESIDENTIAL WOOD COMBUSTION (SUPPLIED BY MISSOULA)
57	SPECIATE 423182.5, RESIDENTIAL WOOD COMBUSTION
58	SPECIATE 423032.5, RESIDENTIAL WOOD COMBUSTION, COMPOSITE
59	SPECIATE 423302.5, COMPOSITE OF RESIDENTIAL WOODBURNING SOURCES
60	SPECIATE 421022.5, WOOD STOVES - AVERAGE ALL FUELS
61	SPECIATE 421012.5, WOOD STOVES - PINE FUELS
62	SPECIATE 3235, RESIDENTIAL WOOD BURNING PROFILE 1
63	SPECIATE 3236, RESIDENTIAL WOOD BURNING PROFILE 2
64	SPECIATE 3238, RESIDENTIAL WOOD BURNING PROFILE 3
65	SPECIATE 3239, RESIDENTIAL WOOD BURNING PROFILE 4
66	SPECIATE 3240, RESIDENTIAL WOOD BURNING PROFILE 5
67	SPECIATE 3769, RESIDENTIAL WOOD BURNING PROFILE 6
68	SPECIATE 3770, RESIDENTIAL WOOD BURNING PROFILE 7
69	SPECIATE 423192.5, RESIDENTIAL WOOD COMBUSTION COMPOSITE
70	SPECIATE 423312.5, RESIDENTIAL WOODSTOVE COMPOSITE
71	SPECIATE 91031, RESIDENTIAL WOOD COMBUSTION: HARDSOFT – COMPOSITE
72	SPECIATE 91032, RESIDENTIAL WOOD COMBUSTION: HARDSOFTN/A – COMPOSITE
73	SPECIATE 91033, RESIDENTIAL WOOD COMBUSTION: SOFT – COMPOSITE
74	SPECIATE 92067, RESIDENTIAL WOOD COMBUSTION: HARD – SIMPLIFIED
75	SPECIATE 92068, RESIDENTIAL WOOD COMBUSTION: HARDSOFT – SIMPLIFIED
76	SPECIATE 92069, RESIDENTIAL WOOD COMBUSTION: HARDSOFT N/A – SIMPLIFIED
77	SPECIATE 92071, RESIDENTIAL WOOD COMBUSTION: SYNTHETIC – SIMPLIFIED
78	SPECIATE 92090, WILDFIRES – SIMPLIFIED
79	SPECIATE 92006, ASPHALT ROOFING – SIMPLIFIED
80	SPECIATE 92025, DISTILLATE OIL COMBUSTION – SIMPLIFIED
81	SPECIATE 92048, NATURAL GAS COMBUSTION – SIMPLIFIED
82	SPECIATE 92052, OVERALL AVERAGE / DEFAULT (WASTE DISPOSAL, MISC) – SIMPLIFIED
83	SPECIATE 92060, PROCESS GAS COMBUSTION – SIMPLIFIED
84	SPECIATE 92063, RESIDENTIAL NATURAL GAS COMBUSTION – SIMPLIFIED
85	SPECIATE 92072, RESIDUAL OIL COMBUSTION – SIMPLIFIED
86	SPECIATE 92075, SEA SALT – SIMPLIFIED
87	SPECIATE 92079, SINTERING FURNACE-SIMPLIFIED (ZINC PROD, FLUE DUST HANDLING)
88	SPECIATE 92082, SOLID WASTE COMBUSTION – SIMPLIFIED
89	SPECIATE 92084, SUBBITUMINOUS COMBUSTION – SIMPLIFIED
90	SPECIATE 92085, SURFACE COATING – SIMPLIFIED
91	SPECIATE 92086, TIRE BURNING – SIMPLIFIED

5.2. CMB Modeling Using Fairbanks-Specific ("OMNI") Profiles

One limitation of using the EPA SPECIATE source profiles for CMB modeling (as described above) is that the profiles are not representative of Fairbanks-specific home heating fuel types. In other words, the

profiles were not developed using Fairbanks specific fuels or generated under Fairbanks-specific operating and meteorological conditions. To address this concern, emission testing was conducted by OMNI Environmental Services (Portland, OR) for a variety of home heating fuels and home heating devices commonly used in Fairbanks. These emissions results were provided to the University of Montana for development of Fairbanks-specific source profiles, with these profiles then used in CMB source apportionment modeling.

Prior to emissions testing, the FNSB provided OMNI with Fairbanks specific fuel types to be used in a variety of home heating devices. The goal of the OMNI testing was to generate emission profiles for the following types of heating appliances and fuel types: pellet stoves, EPA wood stoves (birch, spruce), conventional wood stoves (birch, spruce), EPA hydroponic heaters (birch, spruce), non qualified outdoor hydroponic heaters (spruce, birch, wet stoker coal), oil burners (No. 1 fuel oil, No. 2 fuel oil), waste oil burning, coal stoves (dry stoker coal, wet stoker coal, wet lump coal, dry lump coal), and coal hydroponic heaters (wet stoker coal and coal-typical moisture).

During each of the 41 trials, emission samples were collected on Teflon and quartz filter samples, respectively. From the Teflon filter, $PM_{2.5}$ mass, ions (potassium, sodium, ammonium, nitrate, and sulfate), and elements (33 in total) were quantified. From the quartz filter, levels of Organic Carbon and Elemental Carbon were measured. The Research Triangle Institute (RTI, Research Triangle Park, NC) conducted all of the analyses, and reported results in µg of analyte/filter. Following the completion of OMNI emissions testing, results from the trials were sent to FNSB, ADEC, and Sierra Research for a comprehensive review of methodology (sampling and analytical) and completeness. From the 41 emissions trials that were conducted by OMNI, University of Montana was instructed to focus on only eight of the trials. University of Montana then took the raw emissions data from these eight source types and transformed them into source profiles that were used in the CMB model.

The Fairbanks-specific source profiles that were developed from the OMNI emissions testing are presented in **Table 2.** In developing the profiles, the raw data from OMNI had to be put into a format recognized by the CMB model. First, the raw mass, elemental, OC/EC, and ion data (in µg/filter) measured by the Teflon and quartz filters were corrected for volume ($dsft^3$). This volume was the amount of air collected (for each filter) during each emissions testing trial. For the Teflon filters, the collected volumes varied from 1.12 up to 22.63 $dsft^3$, while for the quartz filter volumes ranged from 1.74 to 21.27 $dsft^3$. These values (µg/ $dsft^3$) were then normalized to the overall mass (units in µg/ $dsft^3$) to give the mass fraction of each species. For uncertainty, a default value of 0.0001 was utilized, with a value of "-99" utilized for missing species.

Table 2: OMNI Source Profiles ("OMNI Profiles") Used in the Fairbanks CMB.

Profile	Description
100	OMNI Profile, EPA Wood Stove, Birch, Low
101	OMNI Profile, EPA OWHH, Birch, Low
102	OMNI Profile, Conventional Wood Stove, Birch, Low
103	OMNI Profile, Oil Burner, No. 2 Fuel Oil
104	OMNI Profile, Coal Stove, Wet Stoker Coal, Low
105	OMNI Profile, Coal HH, Wet Stoker Coal, Single
106	OMNI Profile, WasteOil Brnr, Waste Oil, Single
107	OMNI Profile, EPA Wood Stove, spruce, low
108	OMNI Profile, Coal Stove Dry Lump Coal, low

The eight source profiles developed from the OMNI emissions testing are presented in **Appendix A**.

5.3. CMB Modeling Program QA/QC

A comprehensive QA/QC plan was applied throughout the CMB modeling program to ensure accurate results, including the use of the CMB validation protocol (Watson et al., 2004). The QA/QC protocol:

1) determines model applicability;
2) selects a variety of profiles to represent identified contributors;
3) evaluates model outputs and performance measures;
4) identifies and evaluates deviations from model assumptions;
5) identifies and corrects model input deficiencies;
6) verifies consistency and stability of source contribution estimates; and
7) evaluates CMB results with respect to other data analysis and source assessment methods.

For each model run, evaluations of several different combinations of source profiles were used, with the number of chemical species always exceeding the number of source types. As described in **Table 3**, statistical parameters used to evaluate the validity of source contribution estimates included TSTAT, R^2, Chi^2, DF, and R/U ratios. The results of these fitting parameters (for each modeling run) have to be within the EPA target ranges for the modeling results to be considered valid. It should also be noted that concentrations of species found on field/trip blanks were not subtracted (or blank-corrected) from the ambient sample concentrations before the modeling was conducted.

Table 3: Statistical Criteria for the CMB Model.

Output / Statistic	Abbreviation	EPA Target	Explanation
Std. Error	STD ERR	<SCE	The standard error of the SCE.
T-statistic	TSTAT	> 2.0	The ratio of the value of the SCE to the uncertainty in the SCE. A T-STAT greater than 2 means that the SCE has a relative uncertainty of less than 50%.
R-square	R-SQUARE (R^2)	0.8 to 1.0	A measure of the variance of the ambient concentration explained by the calculated concentration.
Chi-square	CHI-SQUARE (Chi^2)	0.0 to 4.0	A term that compares the difference between the calculated and measured ambient concentrations to the uncertainty of the difference. A perfect fit has a chi-square of 0.0, and a chi-square less than 2 usually indicates a good fit.
Percent Mass Explained	% MASS	100% ± 20%	The ratio of the total calculated to measured mass.
Degrees of Freedom	DF	> 5	The difference between the number of fitting species and the number of fitting sources.
Ratio of Calculated to Measured	RATIO C/M	0.5 to 2.0	The ratio of the calculated to measured concentration of an ambient species. Ideally, this value should be 1.0.
Ratio of Residual to Uncertainty	RATIO R/U	–2.0 to 2.0	The ratio of the residual (calculated minus measured) to the uncertainty of the residual (square root of the sum of squares of the uncertainties).

6.0. $PM_{2.5}$ Sampling Results

In presenting the final $PM_{2.5}$ results (in units of microgram of analyte per cubic meter volume of air collected, $\mu g/m^3$), there were several sample days throughout the program that were excluded from the overall average calculations due to sampler malfunctions or collection errors. Sample days where a

good statistical fit was not achieved using the CMB model were also excluded from the average calculations. A complete listing of these sample days along with a description of why the data points were excluded are presented in **Appendix B**.

6.1. $PM_{2.5}$ Mass Results

Table 4 presents the average $PM_{2.5}$ mass that was measured from Teflon filters collected at each of the sites throughout the program. Overall, wintertime $PM_{2.5}$ average concentrations ranged from 8.2 µg/m^3 (RAMS, winter 2008/2009) up to 46.9 µg/m^3 (NPF3, winter 2012/2013), with many of the sites having frequent exceedances of the 24-hour NAAQS on the scheduled sample days. Results from the summer 2012 show that $PM_{2.5}$ mass averages were very low, averaging less than 6.0 µg/m^3 at both the State Building and NCORE sites. Note that in **Table 4** there are two $PM_{2.5}$ masses listed for the winter 2008/2009 State Building and RAMS sites. The first $PM_{2.5}$ mass values are the average $PM_{2.5}$ concentrations originally presented in the Final Report submitted to ADEC (dated July 23, 2012). For consistency with the CMB modeling results presented in this report, updated CMB modeling was conducted on the 2008/2009 datasets using OMNI profiles in addition to automobile and diesel source profiles (note that auto / diesel exhaust were not identified in the initial OMNI modeling). The second $PM_{2.5}$ mass values presented for 2008/2009 (State Building and RAMS) are the average $PM_{2.5}$ concentrations for those sample days in which updated CMB modeling was conducted. Please note that when using the OMNI profiles, there were times when a statistical fit could not be obtained for a specific sampling day, thus explaining the smaller "n" and therefore different average $PM_{2.5}$ mass (compared to the EPA modeling runs) for specific winters/sites. For the remainder of the winters (2009/2010 through 2012/2013), a single asterisk "*" indicates the average concentrations for the days in which modeling was conducted using only the EPA profiles, while "**" indicates the average $PM_{2.5}$ concentrations for those days in which only OMNI profiles were used for modeling. No asterisk indicates that the number of modeling runs was identical between the EPA and OMNI modeling activities (therefore $PM_{2.5}$ averages were the same).

6.2. $PM_{2.5}$ Chemical Speciation Results

Tables 5 through **11** present the average concentrations (in µg/m^3) of elements, ions, and OC/EC, respectively, measured throughout the sampling programs at each of the sites/years. The minimum detection limits (MDL) in µg/m^3 for each compound are also presented, with the bolded values (within the tables) indicating analyte concentrations measured at or above the MDL. All MDLs were provided by RTI. Also please note that **Table 6** contains the revised average speciated data for the winter 2008/2009 where CMB modeling was updated using the OMNI profiles (along with the automobile and diesel exhaust profiles). For the remainder of the speciated data results in **Tables 7-11**, a single asterisk "*" indicates the average speciated data concentrations for the days in which modeling was conducted using only the EPA profiles, while "**" indicates the average concentrations for those days in which only OMNI profiles were used for modeling. No asterisk indicates that the number of modeling runs was identical between the EPA and OMNI modeling activities (therefore speciated analyte averages were the same).

Out of the 36 elements quantified, only about 13 were consistently measured at or above their reported MDLs. Sulfur typically had the highest concentration of the measured elements (especially at the State Building and Peger Road sites), followed by chlorine and potassium. Regarding the ions that were measured, sulfate had the highest concentration at each of the sites, followed by ammonium and nitrate. Total Carbon (TC) measurements were always heavily influenced by the OC fractions at each of the sites. Results from the field and trip blanks for the species listed in **Tables 5-11** were minimal throughout the sampling/analytical program, therefore data were not blank corrected prior to using in the CMB model.

Table 4: Average $PM_{2.5}$ Mass Concentrations (μg/m^3).

Winter, Site	$PM_{2.5}$ mass	Sampling Dates	n
2005/2006, State Building	18.9	11/3/05 – 3/30/06	36
2006/2007, State Building	19.9	11/1/06 – 3/31/07	39
2007/2008, State Building	18.7	11/2/07 – 3/31/08	40
Winter 2008/2009			
State Building	25.3, 24.4	11/8/08 – 4/7/09	47, 46
North Pole	18.9	1/25/09 – 4/7/09	21
RAMS	8.2, 8.3	1/25/09 – 4/7/09	23, 22
Peger Road	16.8	1/25/09 – 4/7/09	26
Winter 2009/2010			
State Building	28.8*, 24.5**	11/3/09 – 3/15/10	40*, 31**
North Pole	33.7	11/3/09 – 3/15/10	35
RAMS	36.7	11/15/09 – 3/15/10	29
Peger Road	29.0*, 29.5**	11/3/09 – 3/15/10	38*, 37**
Winter 2010/2011			
State Building	20.2	11/1/10 – 2/8/11	15
North Pole	26.8	1/9/11 – 2/5/11	10
Peger Road	28.6	1/9/11 – 2/5/11	10
Winter 2011/2012			
State Building	20.0*, 19.5**	11/2/11 – 3/31/12	38*, 36**
North Pole	24.2*, 23.0**	11/2/11 – 3/25/12	35*, 34**
RAMS	22.1*, 22.7**	12/20/11 – 2/27/12	16*, 15**
NCORE	19.5*, 19.3**	11/2/11 – 3/31/12	44*, 42**
NPF3	18.3	3/1/12 – 3/31/12	7
Summer 2012			
State Building	5.7	6/2/12-8/31/12	20
NCORE	5.1	6/14/12-8/31/12	17
Winter 2012/2013			
State Building	21.8	11/2/12 – 3/29/13	29
NPE	28.1*, 27.8**	11/2/12 – 3/29/13	41*, 40**
NCORE	25.5*, 25.1**	11/2/12 – 3/29/13	38*, 39**
NPF3	46.9	11/2/13 – 3/29/13	42

Note: The minimum detection limit (MDL) for the State Building site was 0.740 μg/m^3, and ~0.745 μg/m^3 for all of the other sites. *EPA profiles used. ** OMNI profiles used.

Table 5: Average $PM_{2.5}$ Elemental, Ion, and OC/EC Concentrations (µg/m^3) – State Building, Winters of 2005/2006, 2006/2007, and 2007/2008.

	State Building 11/3/05 – 3/30/06 n= 36	State Building 11/1/06 – 3/31/07 n=39	State Building 11/2/07 – 3/31/08 n=40	MDL
Magnesium	0.009	0.008	0.006	0.011
Aluminum	**0.020**	**0.031**	0.009	0.013
Silicon	**0.063**	**0.042**	**0.048**	0.011
Phosphorus	0.000	0.002	0.001	0.010
Sulfur	**1.339**	**1.249**	**1.153**	0.007
Chlorine	**0.017**	**0.068**	**0.073**	0.005
Potassium	**0.083**	**0.081**	**0.102**	0.004
Calcium	**0.056**	**0.029**	**0.029**	0.005
Titanium	**0.005**	0.000	0.001	0.004
Vanadium	0.001	0.001	0.000	0.003
Chromium	**0.002**	**0.012**	**0.002**	0.002
Manganese	**0.002**	**0.002**	0.001	0.002
Iron	**0.069**	**0.084**	**0.052**	0.001
Nickel	**0.001**	**0.004**	**0.001**	0.001
Copper	**0.004**	**0.006**	**0.004**	0.001
Zinc	**0.043**	**0.040**	**0.039**	0.003
Gallium	0.001	0.000	0.000	0.002
Arsenic	**0.001**	**0.001**	**0.001**	0.001
Selenium	0.001	0.000	0.000	0.002
Bromine	**0.005**	**0.004**	**0.003**	0.002
Rubidium	0.001	0.000	0.000	0.002
Strontium	**0.006**	**0.006**	**0.002**	0.002
Yttrium	0.001	0.000	0.000	0.003
Zirconium	0.001	0.001	0.000	0.004
Molybdenum	0.000	0.000	0.000	0.006
Silver	0.003	0.002	0.001	0.013
Cadmium	0.003	0.001	0.001	0.017
Indium	0.003	0.001	0.000	0.018
Tin	0.005	0.003	0.002	0.025
Antimony	0.004	0.001	0.001	0.038
Barium	**0.016**	0.002	0.002	0.010
Lanthanum	0.006	0.000	0.000	0.008
Mercury	0.002	0.001	0.000	0.007
Lead	**0.007**	**0.004**	**0.004**	0.004
Sodium	**0.045**	**0.041**	0.028	0.037
Cobalt	0.000	0.000	0.000	0.001
Sulfate	**3.816**	**3.479**	**3.215**	0.010
Nitrate	**1.102**	**1.054**	**0.954**	0.007
Ammonium	**1.648**	**1.573**	**1.446**	0.017
Potassium	**0.072**	**0.064**	**0.095**	0.014
Sodium (ion)	**0.066**	**0.072**	**0.076**	0.027
Total Carbon	**10.4**	**10.9**	**11.1**	0.24
Organic Carbon	**8.7**	**9.3**	**9.2**	0.24
Elemental Carbon	**1.7**	**1.6**	**1.8**	0.24

Note: MDL–minimum detection limit. Bolded values indicate concentrations measured at or above the MDL.

Table 6: Average $PM_{2.5}$ Elemental, Ion, and OC/EC Concentrations (µg/m^3) – Winter 2008/2009.

	State Building 11/8/08 – 4/7/09 n= 47*, 46**	North Pole 1/25/09 – 4/7/09 n=21	RAMS 1/25/09 – 4/7/09 n=23*, 22**	Peger Road 1/25/09 – 4/7/09 n=26	MDL
Magnesium	0.011	**0.012**	**0.016, 0.014**	**0.018**	0.013, 0.011
Aluminum	**0.021**	0.005	0.011	**0.016**	0.014, 0.013
Silicon	**0.049, 0.048**	**0.024**	**0.031, 0.032**	**0.062**	0.011
Phosphorus	0.005	0.001	0.000	**0.010**	0.012, 0.010
Sulfur	**1.730, 1.558**	**0.637**	**0.367, 0.369**	**0.968**	0.008, 0.007
Chlorine	**0.125, 0.123**	**0.103**	**0.100, 0.076**	**0.151**	0.007, 0.005
Potassium	**0.136, 0.131**	**0.113**	**0.041, 0.042**	**0.069**	0.006, 0.004
Calcium	**0.047, 0.046**	**0.014**	**0.015**	**0.045**	0.006, 0.005
Titanium	0.001	0.000	0.000	0.001	0.005, 0.004
Vanadium	0.000	0.000	0.000	0.000	0.003
Chromium	**0.003**	**0.004**	0.000	0.000	0.002
Manganese	0.001	0.001	0.000	0.001	0.002
Iron	**0.058, 0.054**	**0.027**	**0.017**	**0.053**	0.002, 0.001
Nickel	**0.001**	**0.001**	0.000	0.000	0.001
Copper	**0.004**	**0.001**	**0.001**	**0.004**	0.002, 0.001
Zinc	**0.065, 0.062**	**0.015**	**0.008**	**0.058**	0.003, 0.004
Gallium	0.000	0.000	0.000	0.000	0.002
Arsenic	0.000	0.000	**0.001**	0.001	0.001, 0.002
Selenium	0.000	0.000	0.000	0.000	0.002
Bromine	**0.005**	**0.003**	**0.005**	**0.007**	0.002
Rubidium	0.000	0.000	0.000	0.000	0.002
Strontium	**0.004**	0.001	0.001	**0.002**	0.002
Yttrium	0.000	0.000	0.000	0.000	0.003
Zirconium	0.000	0.000	0.000	0.000	0.004, 0.005
Molybdenum	0.000	0.000	0.000	0.000	0.006, 0.009
Silver	0.001	0.002	0.001	0.002	0.013, 0.015
Cadmium	0.002	0.000	0.000	0.000	0.017, 0.019
Indium	0.001	0.002	0.002	0.003	0.018, 0.022
Tin	0.005	0.002	0.002	0.003	0.025, 0.032
Antimony	0.001	0.002	0.002, 0.001	0.001	0.038, 0.042
Barium	0.001	0.000	0.000	0.000	0.015, 0.010
Lanthanum	0.000	0.001	0.000	0.000	0.014, 0.008
Mercury	0.001	0.001	0.001	0.001	0.007, 0.009
Lead	0.003	0.002	0.003	**0.005**	0.004, 0.005
Sodium	**0.113, 0.111**	**0.107**	**0.108, 0.092**	**0.141**	0.037, 0.040
Cobalt	0.000	0.000	0.000	**0.001**	0.001
Sulfate	**4.585, 4.194**	**1.739**	**1.052, 1.056**	**2.541**	0.010
Nitrate	**1.282, 1.268**	**0.709**	**0.615, 0.623**	**1.127**	0.007
Ammonium	**2.160, 1.974**	**0.683**	**0.430, 0.439**	**1.235**	0.018, 0.017
Potassium	**0.137, 0.134**	**0.135**	**0.058, 0.057**	**0.096**	0.015, 0.014
Sodium (ion)	**0.126, 0.126**	**0.155**	**0.148, 0.132**	**0.162**	0.027, 0.030
Total Carbon	**14.5, 13.7**	**12.6**	**5.1, 5.2**	**10.0**	0.24
Organic Carbon	**12.9, 12.2**	**11.7**	**4.7, 4.8**	**8.7**	0.24
Elemental Carbon	**1.6, 1.5**	**0.9**	**0.5**	**1.3**	0.24

Note: MDL–minimum detection limit. MDLs include those from both the State building, and other three sites. Bolded values indicate concentrations measured at or above the MDL. *Average concentrations originally presented in the Final Report submitted to ADEC (dated July 23, 2012). **Average concentrations for those sample days in which updated CMB modeling (with OMNI profiles as well as auto/diesel profiles) was conducted.

Table 7: Average $PM_{2.5}$ Elemental, Ion, and OC/EC Concentrations (µg/m^3) – Winter 2009/2010.

	State Building 11/3/09–3/15/10 n=40*, 31**	**North Pole 11/3/09–3/15/10 n=35**	**RAMS 11/15/09–3/15/10 n=29**	**Peger Road 11/3/09–3/15/10 n=38*, 37****	**MDL**
Magnesium	0.009	0.004	0.003	0.007, 0.008	0.013, 0.011
Aluminum	**0.020, 0.014**	0.004	0.008	0.007	0.014, 0.013
Silicon	**0.054, 0.050**	**0.031**	**0.057**	**0.073, 0.074**	0.011
Phosphorus	0.008, 0.004	0.000	0.000	**0.025, 0.026**	0.012, 0.010
Sulfur	**1.760, 1.404**	**0.915**	**1.388**	**1.618, 1.654**	0.008, 0.007
Chlorine	**0.151, 0.116**	**0.151**	**0.154**	**0.290, 0.297**	0.007, 0.005
Potassium	**0.130, 0.114**	**0.202**	**0.185**	**0.132, 0.134**	0.006, 0.004
Calcium	**0.042, 0.039**	**0.014**	**0.028**	**0.058, 0.059**	0.006, 0.005
Titanium	0.001, 0.002	0.001	0.002	0.003	0.005, 0.004
Vanadium	0.000	0.000	0.000	0.000	0.003
Chromium	**0.002**	0.000	**0.004**	0.001	0.002
Manganese	**0.002**	0.001	**0.006**	**0.004**	0.002
Iron	**0.061, 0.055**	**0.024**	**0.080**	**0.109, 0.111**	0.002, 0.001
Nickel	**0.001**	0.000	**0.004**	0.000	0.001
Copper	**0.006, 0.004**	**0.006**	**0.004**	**0.008**	0.002, 0.001
Zinc	**0.072, 0.061**	**0.031**	**0.045**	**0.121, 0.123**	0.003, 0.004
Gallium	0.000	0.000	0.000	0.000	0.002
Arsenic	**0.001,** 0.000	0.000	**0.001**	**0.001**	0.001, 0.002
Selenium	0.000	0.000	0.000	0.000	0.002
Bromine	**0.004, 0.003**	**0.004**	**0.011**	**0.011**	0.002
Rubidium	0.001	0.000	0.000	0.000	0.002
Strontium	**0.002**	0.000	0.001	0.001	0.002
Yttrium	0.000	0.000	0.000	0.000	0.003
Zirconium	0.001	0.000	0.000	0.000	0.004, 0.005
Molybdenum	0.000	0.000	0.000	0.000	0.006, 0.009
Silver	0.002	0.002	0.001	0.002	0.013, 0.015
Cadmium	0.003	0.001	0.001	0.003	0.017, 0.019
Indium	0.003	0.001	0.003	0.001	0.018, 0.022
Tin	0.004, 0.003	0.004	0.004	0.001	0.025, 0.032
Antimony	0.007, 0.008	0.008	0.008	0.006, 0.005	0.038, 0.042
Barium	0.005	0.000	0.000	0.000	0.015, 0.010
Lanthanum	0.000	0.000	0.000	0.000	0.014, 0.008
Mercury	0.000	0.000	0.000	0.000	0.007, 0.009
Lead	**0.005**, 0.004	**0.004**	**0.014**	**0.017**	0.004, 0.005
Sodium	**0.084, 0.077**	**0.076**	**0.086**	**0.140, 0.142**	0.037, 0.040
Cobalt	0.000	0.000	0.000	0.000	0.001
Sulfate	**4.633, 3.911**	**2.452**	**3.890**	**4.173, 4.256**	0.010
Nitrate	**1.505, 1.417**	**0.888**	**1.029**	**1.706, 1.725**	0.007
Ammonium	**2.433, 1.894**	**1.232**	**1.822**	**2.420, 2.460**	0.018, 0.017
Potassium	**0.141, 0.129**	**0.184**	**0.170**	**0.123, 0.125**	0.015, 0.014
Sodium (ion)	**0.080, 0.079**	**0.117**	**0.135**	**0.134, 0.131**	0.027, 0.030
Total Carbon	**13.2, 11.4**	**22.3**	**24.1**	**16.2, 16.5**	0.24
Organic Carbon	**11.5, 10.0**	**19.8**	**21.5**	**13.4, 13.7**	0.24
Elemental Carbon	**1.7, 1.4**	**2.5**	**2.6**	**2.8**	0.24

Note: MDL–minimum detection limit. MDLs include those from both the State building, and other three sites. Bolded values indicate concentrations measured at or above the MDL. *EPA runs only. **OMNI runs only.

Table 8: Average $PM_{2.5}$ Elemental, Ion, and OC/EC Concentrations (µg/m^3) – Winter 2010/2011.

Analyte	State Building 11/1/10–2/8/11 n=15	North Pole 1/9/11–2/5/11 n=10	Peger Road 1/9/11–2/5/11 n=10	MDL
Magnesium	0.001	0.000	0.000	0.013, 0.011
Aluminum	0.008	**0.015**	**0.033**	0.014, 0.013
Silicon	**0.027**	0.009	**0.032**	0.011
Phosphorus	0.002	0.000	**0.014**	0.012, 0.010
Sulfur	**1.188**	**0.757**	**1.608**	0.008, 0.007
Chlorine	**0.089**	**0.112**	**0.280**	0.007, 0.005
Potassium	**0.089**	**0.184**	**0.142**	0.006, 0.004
Calcium	**0.027**	**0.016**	**0.046**	0.006, 0.005
Titanium	0.001	0.000	0.001	0.005, 0.004
Vanadium	0.000	0.000	0.000	0.003
Chromium	**0.002**	0.000	0.000	0.002
Manganese	0.001	0.000	**0.004**	0.002
Iron	**0.040**	**0.019**	**0.076**	0.002, 0.001
Nickel	**0.001**	0.000	0.000	0.001
Copper	**0.002**	**0.002**	**0.007**	0.002, 0.001
Zinc	**0.051**	**0.029**	**0.107**	0.003, 0.004
Gallium	0.000	0.000	0.000	0.002
Arsenic	0.000	**0.001**	**0.001**	0.001, 0.002
Selenium	0.000	0.000	0.000	0.002
Bromine	**0.004**	**0.002**	**0.010**	0.002
Rubidium	0.000	0.000	0.000	0.002
Strontium	0.001	0.000	**0.007**	0.002
Yttrium	0.000	0.000	0.000	0.003
Zirconium	0.000	0.001	0.001	0.004, 0.005
Molybdenum	0.000	0.000	0.000	0.006, 0.009
Silver	0.001	0.000	0.000	0.013, 0.015
Cadmium	0.001	0.003	0.004	0.017, 0.019
Indium	0.002	0.005	0.001	0.018, 0.022
Tin	0.001	0.000	0.000	0.025, 0.032
Antimony	0.006	0.012	0.002	0.038, 0.042
Barium	0.000	0.000	0.000	0.015, 0.010
Lanthanum	0.000	0.000	0.000	0.014, 0.008
Mercury	0.000	0.000	0.000	0.007, 0.009
Lead	0.003	0.001	**0.014**	0.004, 0.005
Sodium	**0.044**	0.003	**0.060**	0.037, 0.040
Cobalt	0.000	0.000	**0.001**	0.001
Sulfate	**3.352**	**2.393**	**5.047**	0.010
Nitrate	**1.158**	**0.755**	**1.790**	0.007
Ammonium	**1.565**	**0.885**	**2.396**	0.018, 0.017
Potassium	**0.084**	**0.165**	**0.147**	0.015, 0.014
Sodium (ion)	**0.030**	**0.062**	**0.081**	0.027, 0.030
Total Carbon	**8.5**	**16.7**	**15.3**	0.24
Organic Carbon	**7.5**	**14.6**	**12.6**	0.24
Elemental Carbon	**1.0**	**2.1**	**2.7**	0.24

Note: MDL–minimum detection limit. MDLs include those from both the state building, and other two sites. Bolded values indicate concentrations measured at or above the MDL.

Table 9: Average $PM_{2.5}$ Elemental, Ion, and OC/EC Concentrations (µg/m^3) – Winter 2011/2012.

	State Building 11/2/11 – 3/31/12 n=38*, 36**	**North Pole 11/2/11 – 3/25/12 n=35*, 34****	**RAMS 12/20/11 – 2/27/12 n=16*, 15****	**NCORE 11/2/11 – 3/31/12 n=44*, 42****	**NPF3 3/1/12 – 3/31/12 n=7**	**MDL**
Magnesium	**0.011**, 0.009	**0.019, 0.017**	**0.015, 0.016**	**0.017, 0.018**	**0.023**	0.011
Aluminum	0.009, 0.008	0.001	0.009	0.007, 0.008	0.010	0.013
Silicon	**0.042, 0.043**	**0.017**	**0.037, 0.036**	**0.033, 0.032**	**0.031**	0.011
Phosphorus	0.000	0.000	0.000	0.000	0.000	0.010
Sulfur	**1.203, 1.153**	**0.655, 0.627**	**0.971, 0.998**	**1.049**	**0.584**	0.007
Chlorine	**0.080**	**0.150, 0.145**	**0.113, 0.118**	**0.112**	**0.164**	0.005
Potassium	**0.114, 0.111**	**0.264, 0.258**	**0.200, 0.209**	**0.132**	**0.164**	0.004
Calcium	**0.028, 0.027**	**0.017, 0.016**	**0.032, 0.033**	**0.026**	**0.014**	0.005
Titanium	0.003	0.001, 0.000	0.001	0.001	0.000	0.004
Vanadium	0.000	0.000	0.000	0.000	0.000	0.003
Chromium	**0.002**, 0.001	0.001	0.001	0.001	0.000	0.002
Manganese	0.001	0.001	**0.002, 0.003**	**0.002, 0.001**	0.001	0.002
Iron	**0.042, 0.041**	**0.020**	**0.062, 0.064**	**0.039, 0.037**	**0.015**	0.001
Nickel	0.000	0.000	**0.001**	0.000	0.000	0.001
Copper	**0.003**	**0.004**	**0.006**	**0.004**	**0.001**	0.001
Zinc	**0.041**	**0.023, 0.022**	**0.039, 0.041**	**0.037, 0.036**	**0.012**	0.003
Gallium	0.000	0.000	0.000	0.000	0.000	0.002
Arsenic	0.000	0.000	0.000	**0.001**	0.000	0.001
Selenium	0.000	0.000	0.000	0.000	0.000	0.002
Bromine	**0.005**	**0.004, 0.003**	**0.003**	**0.005**	**0.008**	0.002
Rubidium	0.000	0.000	0.000	0.000	0.000	0.002
Strontium	**0.003**	**0.002**	**0.006**	**0.003**	0.000	0.002
Yttrium	0.000	0.000	0.000	0.000	0.000	0.003
Zirconium	0.001	0.001	0.002	0.001	0.000	0.004
Molybdenum	0.000	0.000	0.000	0.000	0.000	0.006
Silver	0.001	0.000	0.000	0.000	0.002	0.013
Cadmium	0.003	0.001	0.000	0.001	0.000	0.017
Indium	0.002	0.002	0.001	0.002	0.001	0.018
Tin	0.004	0.001, 0.002	0.005	0.002	0.000	0.025
Antimony	0.007, 0.006	0.008	0.005	0.008, 0.009	0.005	0.038
Barium	0.000	0.004	**0.023, 0.022**	**0.010**	0.000	0.010
Lanthanum	0.000	0.000	0.000	0.000	0.000	0.008
Mercury	0.000	0.000	0.000	0.000	0.000	0.007
Lead	0.001, 0.002	0.001	0.002	0.002	0.000	0.004
Sodium	**0.097, 0.092**	**0.098, 0.095**	**0.076, 0.078**	**0.107, 0.109**	**0.148**	0.037
Cobalt	0.000	0.000	**0.001**	**0.001**	0.000	0.001
Sulfate	**3.283, 3.135**	**1.817, 1.733**	**2.883, 2.764**	**2.900, 2.901**	**1.576**	0.010
Nitrate	**0.924, 0.915**	**0.502, 0.493**	**0.949, 0.936**	**0.827, 0.815**	**0.462**	0.007
Ammonium	**1.228, 1.176**	**0.491, 0.462**	**0.969, 0.923**	**0.991, 0.992**	**0.432**	0.017
Potassium	**0.095, 0.093**	**0.237, 0.231**	**0.157, 0.159**	**0.105**	**0.114**	0.014
Sodium (ion)	**0.104, 0.101**	**0.101, 0.098**	**0.071, 0.072**	**0.094, 0.095**	**0.143**	0.027
Total Carbon	**8.5, 8.6**	**13.7, 13.4**	**12.4, 12.2**	**10.6, 10.9**	**12.5**	0.24
Organic Carbon	**7.3, 7.4**	**12.5, 12.3**	**10.6, 10.4**	**9.0, 9.2**	**11.3**	0.24
Elemental Carbon	**1.2, 1.3**	**1.2, 1.1**	**1.8**	**1.6**	**1.2**	0.24

Note: MDL–minimum detection limit. Bolded values indicate concentrations measured at or above the MDL.
*EPA runs only. **OMNI runs only.

Table 10: Average $PM_{2.5}$ Elemental, Ion, and OC/EC Concentrations (µg/m^3) – Summer 2012.

	State Building 6/2/12 – 8/31/12 n=20	NCORE 6/14/12 – 8/31/12 n=17	MDL
Magnesium	0.001	0.000	0.011
Aluminum	**0.021**	**0.021**	0.013
Silicon	**0.080**	**0.098**	0.011
Phosphorus	0.000	0.000	0.010
Sulfur	**0.143**	**0.146**	0.007
Chlorine	**0.005**	0.002	0.005
Potassium	**0.025**	**0.023**	0.004
Calcium	**0.018**	**0.020**	0.005
Titanium	0.003	0.002	0.004
Vanadium	0.000	0.000	0.003
Chromium	**0.002**	0.000	0.002
Manganese	0.001	0.001	0.002
Iron	**0.040**	**0.042**	0.001
Nickel	0.000	0.000	0.001
Copper	**0.001**	**0.001**	0.001
Zinc	0.002	**0.003**	0.003
Gallium	0.000	0.000	0.002
Arsenic	0.000	0.000	0.001
Selenium	0.000	0.000	0.002
Bromine	0.001	0.001	0.002
Rubidium	0.000	0.000	0.002
Strontium	0.001	0.000	0.002
Yttrium	0.000	0.000	0.003
Zirconium	0.000	0.001	0.004
Molybdenum	0.000	0.000	0.006
Silver	0.001	0.000	0.013
Cadmium	0.002	0.000	0.017
Indium	0.002	0.000	0.018
Tin	0.005	0.001	0.025
Antimony	0.012	0.011	0.038
Barium	0.000	0.000	0.010
Lanthanum	0.000	0.000	0.008
Mercury	0.000	0.000	0.007
Lead	0.000	0.000	0.004
Sodium	0.007	0.011	0.037
Cobalt	0.000	0.000	0.001
Sulfate	**0.358**	**0.311**	0.010
Nitrate	**0.181**	**0.207**	0.007
Ammonium	**0.051**	**0.025**	0.017
Potassium	**0.010**	**0.020**	0.014
Sodium (ion)	**0.017**	**0.059**	0.027
Total Carbon	**2.0**	**4.6**	0.24
Organic Carbon	**1.8**	**4.2**	0.24
Elemental Carbon	**0.22**	**0.4**	0.24

Note: MDL–minimum detection limit. Bolded values indicate concentrations measured at or above the MDL.

Table 11: Average $PM_{2.5}$ Elemental Concentrations (µg/m^3) – Winter 2012/2013.

	State Building 11/2/12 – 3/29/13 n=29	**NPE 11/2/12 – 3/29/13 n=41*, 40****	**NCORE 11/2/12 – 3/29/13 n=38*, 39****	**NPF3 11/2/13 – 3/29/13 n=42**	**MDL**
Magnesium	0.007	0.010	0.006	0.010	0.011
Aluminum	0.008	0.003	0.008	0.001	0.013
Silicon	**0.043**	**0.021**	**0.045, 0.044**	**0.029**	0.011
Phosphorus	0.005	0.001	0.008	0.001	0.010
Sulfur	**1.370**	**0.891, 0.892**	**1.602, 1.573**	**1.239**	0.007
Chlorine	**0.078**	**0.096, 0.097**	**0.081, 0.080**	**0.131**	0.005
Potassium	**0.154**	**0.310, 0.309**	**0.192, 0.189**	**0.438**	0.004
Calcium	**0.036**	**0.018**	**0.038**	**0.014**	0.005
Titanium	0.001	0.000	0.001	0.001	0.004
Vanadium	0.000	0.000	0.000	0.000	0.003
Chromium	**0.002**	**0.002**	**0.003**	0.001	0.002
Manganese	0.001	0.001	0.001	0.001	0.002
Iron	**0.051**	**0.031, 0.030**	**0.054, 0.053**	**0.028**	0.001
Nickel	**0.001**	0.000	**0.001,** 0.000	0.000	0.001
Copper	**0.003**	**0.002**	**0.003**	**0.002**	0.001
Zinc	**0.053**	**0.030**	**0.055**	**0.037**	0.003
Gallium	0.000	0.000	0.000	0.000	0.002
Arsenic	0.000	0.000	0.000	**0.001**	0.001
Selenium	0.000	0.000	0.000	0.000	0.002
Bromine	**0.004**	**0.004**	**0.004**	**0.003**	0.002
Rubidium	0.000	0.000	0.000	0.001	0.002
Strontium	**0.003**	0.001	**0.003**	**0.002**	0.002
Yttrium	0.000	0.000	0.000	0.000	0.003
Zirconium	0.001	0.001	0.000	0.001	0.004
Molybdenum	0.000	0.000	0.000	0.000	0.006
Silver	0.000	0.001	0.001	0.001	0.013
Cadmium	0.001	0.001	0.000	0.000	0.017
Indium	0.001	0.003	0.003, 0.002	0.003	0.018
Tin	0.003	0.003	0.002	0.003	0.025
Antimony	0.007	0.001	0.001	0.002	0.038
Barium	0.002	0.001	0.004	0.001	0.010
Lanthanum	0.000	0.000	0.000	0.000	0.008
Mercury	0.000	0.000	0.000	0.000	0.007
Lead	0.002	0.001	0.002	0.002	0.004
Sodium	**0.068**	**0.064, 0.066**	**0.062**	**0.066**	0.037
Cobalt	0.000	0.000	0.000	0.000	0.001
Sulfate	**3.496**	**2.476, 2.287**	**3.970, 4.088**	**3.004**	0.010
Nitrate	**1.074**	**0.686, 0.655**	**1.250**	**0.805**	0.007
Ammonium	**1.409**	**0.878, 0.783**	**1.636, 1.672**	**1.099**	0.017
Potassium	**0.118**	**0.288**	**0.177, 0.180**	**0.374**	0.014
Sodium (ion)	**0.047**	**0.181, 0.184**	**0.157, 0.155**	**0.130**	0.027
Total Carbon	**9.2**	**18.6, 18.3**	**14.3, 14.5**	**33.3**	0.24
Organic Carbon	**7.5**	**16.3, 16.0**	**12.1, 12.3**	**29.8**	0.24
Elemental Carbon	**1.6**	**2.4, 2.3**	**2.2, 2.2**	**3.6**	0.24

Note: MDL–minimum detection limit. Bolded values indicate concentrations measured at or above the MDL.
*EPA runs only. **OMNI runs only.

7.0. Chemical Mass Balance Results

Tables 12 and 13 present the $PM_{2.5}$ sources identified by the CMB model for each of the sites when using the EPA source profiles, including source contribution estimates (± standard errors) and % of total $PM_{2.5}$. **Tables 14 and 15** present the CMB results when using the OMNI profiles. In addition, **Figures 1-6** present the sources identified (over time) for each of the sites using the EPA source profiles, while **Figures 7-12** present the source trends for each of the sites using the OMNI profiles. Finally, CMB results are summarized as pie charts in **Figures 13-64** for both EPA and OMNI profiles for each winter/site, followed by a table comparing the results generated when using both the EPA and OMNI source profiles (**Tables 16-40**).

When using the EPA profiles, five source profile types were identified by the CMB model as contributors to the ambient $PM_{2.5}$ throughout the winter months. Wood smoke (likely residential wood combustion) was the major source of $PM_{2.5}$ identified, contributing between ~60% to over 80% of the measured $PM_{2.5}$ at the monitoring sites. The other sources of $PM_{2.5}$ identified by the CMB model were secondary sulfate (~7-21%), ammonium nitrate (3-11%), diesel exhaust (not detected-11%), and automobiles (not detected-7%). Approximately 1-2% of the $PM_{2.5}$ was unexplained by the CMB model.

When utilizing the OMNI profiles in the CMB, the results are somewhat different. In addition to the five profiles identified using the EPA profiles, the OMNI source profile representing No. 2 fuel oil was also identified in nearly every CMB run. Wood smoke was still identified as the largest source of wintertime $PM_{2.5}$ at the North Pole, RAMS, NCORE, NPF3, and NPE sites. However, at the State Building and Peger Road sites, No. 2 fuel oil combustion was found to be the largest source, contributing from 30-50% of the ambient wintertime $PM_{2.5}$.

It should be noted that the results of CMB modeling using OMNI profiles for the winter of 2008/2009 were originally presented to ADEC in a previous report (July 23, 2012). In carrying out the updated modeling using the OMNI profiles in other years (in addition to the winter of 2008/2009), it was discovered that automobiles and diesel exhaust contributed a small amount to ambient $PM_{2.5}$ when using the OMNI profiles. To be consistent with results from the other winters, the 2008/2009 data sets were re-analyzed for the State Building, RAMS, North Pole, and Peger Road sites, with these results presented in **Table 14**. Results for the North Pole and RAMS sites remained unchanged to the previous modeling. However, for the State Building and Peger Road sites, automobiles and diesel exhaust which were not detected in the initial CMB modeling were now detected at low contributions (autos: 0.3-1.7%; diesel: 0.1-0.5%). Using this new profile combination also lowered the wood smoke contribution from 56.0% to 36.1% at the State Building, while No. 2 fuel oil contributions increased from 14.2% to 47.4%. At the Peger Road site, wood smoke was revised to 42.0% while No. 2 fuel oil was elevated from 27.2% to 38.7%. These new findings as well as those from the other winters illustrate that No. 2 fuel oil combustion is a significant source of ambient $PM_{2.5}$ (when using the OMNI profiles) – especially at the State Building and Peger Road sites.

For the first time, CMB source apportionment modeling was conducted during the summer months in Fairbanks. Overall, ambient $PM_{2.5}$ concentrations were very low at both sites during the summer of 2012 (5.7 $\mu g/m^3$ at the State Building, and 5.1 $\mu g/m^3$ at the NCORE site). Contributions of sulfate, ammonium nitrate, and street sand/road dust were very similar between the State Building and NCORE sites. More vehicle emissions were detected at the NCORE site compared to the State Building site when using both EPA and OMNI profiles. As expected, No. 2 fuel oil was not detected at either site. However, wood smoke was still determined to be the largest source at both sites (56-74%), likely due to residential outdoor biomass waste burning and influences from regional wildland fire events.

Table 12: Source Contribution Estimates ± Standard Errors (μg/m^3) – EPA profiles.
Note that percentages in parentheses are percent contributions to overall ambient $PM_{2.5}$ mass.

	Sulfate	Ammonium Nitrate	Diesel	Autos	Wood Smoke	Unexplained	$PM_{2.5}$ Mass	n	Sampling Dates
State Building 2005/2006	4.0±0.5 (21.0 %)	1.8 ±0.5 (9.6 %)	1.3±0.4 (7.1 %)	0.4±0.2 (2.3 %)	11.3±1.7 (59.8 %)	0.1 (0.3 %)	18.9	36	11/3/05-3/30/06
State Building 2006/2007	3.7±0.5 (18.7 %)	1.7 ±0.5 (8.4 %)	1.5±0.5 (7.6 %)	1.1±0.4 (5.8 %)	11.5±2.0 (57.9 %)	0.3 (1.6 %)	19.9	39	11/1/06-3/31/07
State Building 2007/2008	3.4±0.4 (18.2 %)	1.5±0.5 (8.1 %)	1.7±0.5 (9.0 %)	1.2±0.4 (6.2 %)	10.9±1.6 (58.5 %)	0.02 (0.1 %)	18.7	40	11/2/07-3/31/08
2008/2009	**Sulfate**	**Ammonium Nitrate**	**Diesel**	**Autos**	**Wood Smoke**	**Unexplained**	**$PM_{2.5}$ Mass**	**n**	**Sampling Dates**
State Building	5.1±0.6 (20.0 %)	2.1 ±0.7 (8.1 %)	0.3±0.1 (1.1 %)	1.7±0.7 (6.8 %)	16.0±2.3 (63.1 %)	0.2 (0.8 %)	25.3	47	11/8/08-4/7/09
North Pole	1.9±0.2 (9.8 %)	1.0±0.2 (5.1 %)	0.2±0.05 (0.8 %)	0.7±0.3 (3.7 %)	15.0±2.0 (79.8 %)	0.2 (0.8 %)	18.9	21	1/25/09-4/7/09
RAMS	1.1±0.1 (13.0 %)	0.9±0.1 (10.5 %)	ND	ND	6.3±0.8 (76.0 %)	0.04 (0.5 %)	8.2	23	1/25/09-4/7/09
Peger Road	2.8±0.3 (16.7 %)	1.5±0.4 (8.9 %)	1.2±0.5 (7.3 %)	0.7±0.2 (3.9 %)	10.6±1.6 (62.7 %)	0.1 (0.5 %)	16.8	26	1/25/09-4/7/09
2009/2010	**Sulfate**	**Ammonium Nitrate**	**Diesel**	**Autos**	**Wood Smoke**	**Unexplained**	**$PM_{2.5}$ Mass**	**n**	**Sampling Dates**
State Building	5.2±0.6 (18.1 %)	2.5±0.7 (8.9 %)	0.6±0.3 (2.2 %)	0.7±0.3 (2.5 %)	19.5±1.9 (67.8 %)	0.2 (0.6 %)	28.8	40	11/3/09-3/15/10
North Pole	2.6±0.3 (7.8 %)	1.2±0.3 (3.6 %)	0.8±0.2 (2.5 %)	1.3±0.4 (3.8 %)	27.1±3.7 (81.2 %)	0.3 (1.0 %)	33.7	35	11/3/09-3/15/10
RAMS	4.0±0.5 (10.9 %)	0.9±0.2 (2.5 %)	2.5±0.6 (6.8 %)	2.3±0.7 (6.2 %)	26.9±4.1 (73.5 %)	0.04 (0.1 %)	36.7	29	11/15/09-3/15/10
Peger Road	4.8±0.5 (16.5 %)	2.1±0.6 (7.4 %)	2.8±0.7 (9.6 %)	0.4±0.1 (1.3 %)	18.6±3.0 (64.4 %)	0.3 (0.9 %)	29.0	38	11/3/09-3/15/10
2010/2011	**Sulfate**	**Ammonium Nitrate**	**Diesel**	**Autos**	**Wood Smoke**	**Unexplained**	**$PM_{2.5}$ Mass**	**n**	**Sampling Dates**
State Building	3.5±0.4	1.7±0.5	ND	0.4±0.1	14.6±1.1	0.004	20.2	15	11/1/10-

	(17.3 %)	(8.4 %)		(1.9 %)	(72.4 %)	(0.02 %)			2/8/11
North Pole	2.1±0.3 (8.0 %)	0.9±0.2 (3.5 %)	0.9±0.3 (3.4 %)	1.4±0.5 (5.1 %)	21.3±3.2 (79.4 %)	0.2 (0.6 %)	26.8	10	1/9/11-2/5/11
Peger Road	4.8±0.5 (16.6 %)	2.0±0.5 (7.1 %)	0.8±0.2 (2.9 %)	0.7±0.3 (2.5 %)	20.2±3.9 (70.6 %)	0.1 (0.3 %)	28.6	10	1/9/11-2/5/11
2011/2012	**Sulfate**	**Ammonium Nitrate**	**Diesel**	**Autos**	**Wood Smoke**	**Unexplained**	**$PM_{2.5}$ Mass**	**n**	**Sampling Dates**
State Building	3.5±0.4 (17.8 %)	1.5±0.5 (7.5 %)	0.2±0.04 (1.2 %)	0.4±0.1 (2.1 %)	14.0±1.4 (70.4 %)	0.2 (1.0 %)	20.0	38	11/2/11-3/31/12
North Pole	1.8±0.2 (7.8 %)	0.7±0.2 (3.1 %)	0.1±0.04 (0.6 %)	0.3±0.1 (1.2 %)	20.4±2.3 (85.5 %)	0.4 (1.9 %)	24.2	35	11/2/11-3/25/12
RAMS	2.9±0.3 (13.2 %)	1.4±0.4 (6.4 %)	1.2±0.3 (5.7 %)	0.9±0.4 (4.0 %)	14.9±1.8 (69.0 %)	0.4 (1.8 %)	22.1	16	12/20/11-2/27/12
NCORE	3.0±0.3 (15.8 %)	1.3±0.4 (6.8 %)	1.4±0.5 (7.5 %)	0.8±0.3 (4.2 %)	12.4±1.6 (64.4 %)	0.2 (1.3 %)	19.5	44	11/2/11-3/31/12
NPF3	1.7±0.2 (9.2 %)	0.7±0.2 (3.8 %)	0.9±0.4 (4.9 %)	0.8±0.4 (4.2 %)	14.2±2.0 (77.0 %)	0.2 (1.0 %)	18.3	7	3/1/12-3/31/12
2012/2013	**Sulfate**	**Ammonium Nitrate**	**Diesel**	**Autos**	**Wood Smoke**	**Unexplained**	**$PM_{2.5}$ Mass**	**n**	**Sampling Dates**
State Building	3.9±0.5 (17.9 %)	1.7±0.5 (8.0 %)	1.2±0.4 (5.5 %)	0.1±0.04 (0.5 %)	14.7±1.5 (67.7 %)	0.1 (0.6 %)	21.8	29	11/2/12-3/29/13
NPE	2.5±0.3 (9.0 %)	1.1±0.3 (3.8 %)	3.0±0.6 (10.9 %)	0.7±0.2 (2.6 %)	20.3±2.5 (72.8 %)	0.2 (0.8 %)	28.1	41	11/2/12-3/29/13
NCORE	4.7±0.5 (18.4 %)	2.0±0.6 (7.9 %)	2.4±0.7 (9.6 %)	1.1±0.5 (4.4 %)	15.1±2.0 (59.3 %)	0.1 (0.3 %)	25.5	38	11/2/12-3/29/13
NPF3	3.4±0.4 (7.4 %)	1.3±0.4 (2.8 %)	4.5±0.9 (9.8 %)	0.6±0.2 (1.4 %)	35.9±4.2 (77.6 %)	0.5 (1.0 %)	46.9	42	11/2/12-3/29/13

ND: not detected by the CMB model. Sampling was not conducted at the RAMS site during the winter of 2010/2011.

Table 13: Source Contribution Estimates ± Standard Errors (μg/m^3) – Summer 2012 EPA Profiles.

Summer 2012	**Sulfate**	**Ammonium Nitrate**	**Diesel**	**Autos**	**Street Sand**	**Wood Smoke**	**Unexplained**	**$PM_{2.5}$ Mass**	**n**	**Sampling Dates**
State Building	0.4±0.1 (7.1 %)	0.2±0.1 (3.9 %)	0.01±0.003 (0.1 %)	0.2±0.1 (3.9 %)	0.3±0.1 (4.4 %)	4.2±0.2 (73.7 %)	0.4 (6.9 %)	5.7	20	6/2/12-8/31/12
NCORE	0.4±0.1 (6.8 %)	0.2±0.1 (3.8 %)	0.3±0.1 (4.9 %)	1.0±0.2 (17.2%)	0.3±0.1 (4.6 %)	3.3±0.4 (56.0 %)	0.4 (6.7 %)	5.1	17	6/14/12-8/31/12

Figure 1: State Building Source Contribution Estimates (µg/m^3) – EPA profiles.

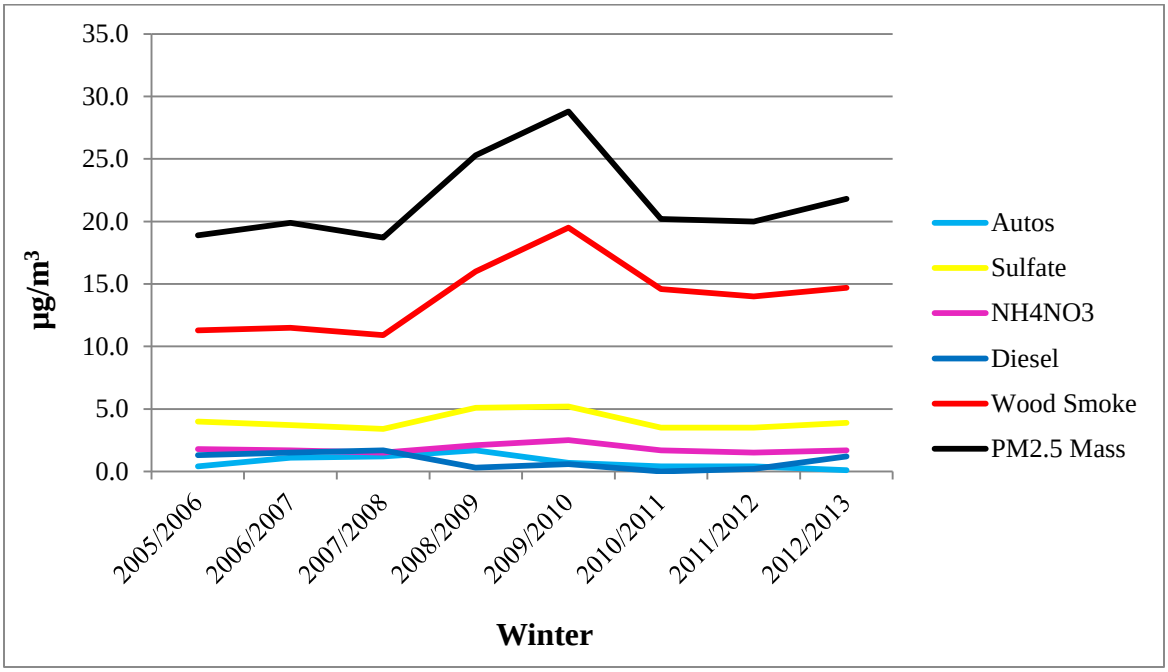

Figure 2: North Pole Source Contribution Estimates (µg/m^3) – EPA profiles.

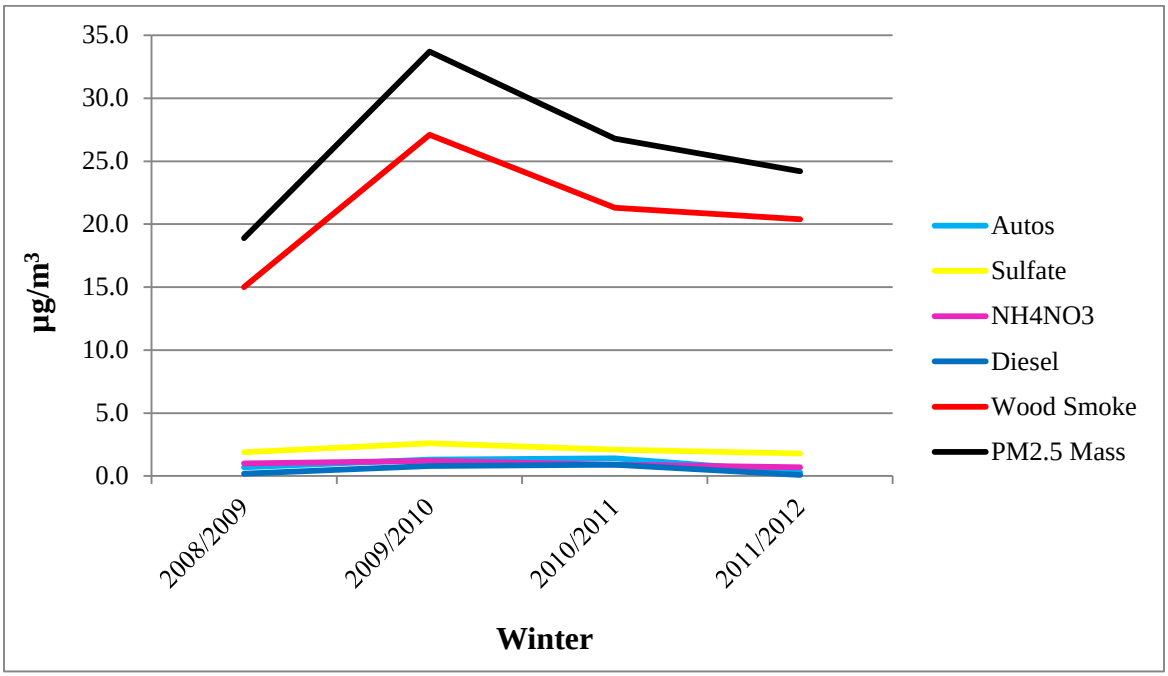

Figure 3: RAMS Source Contribution Estimates (µg/m³) – EPA profiles.

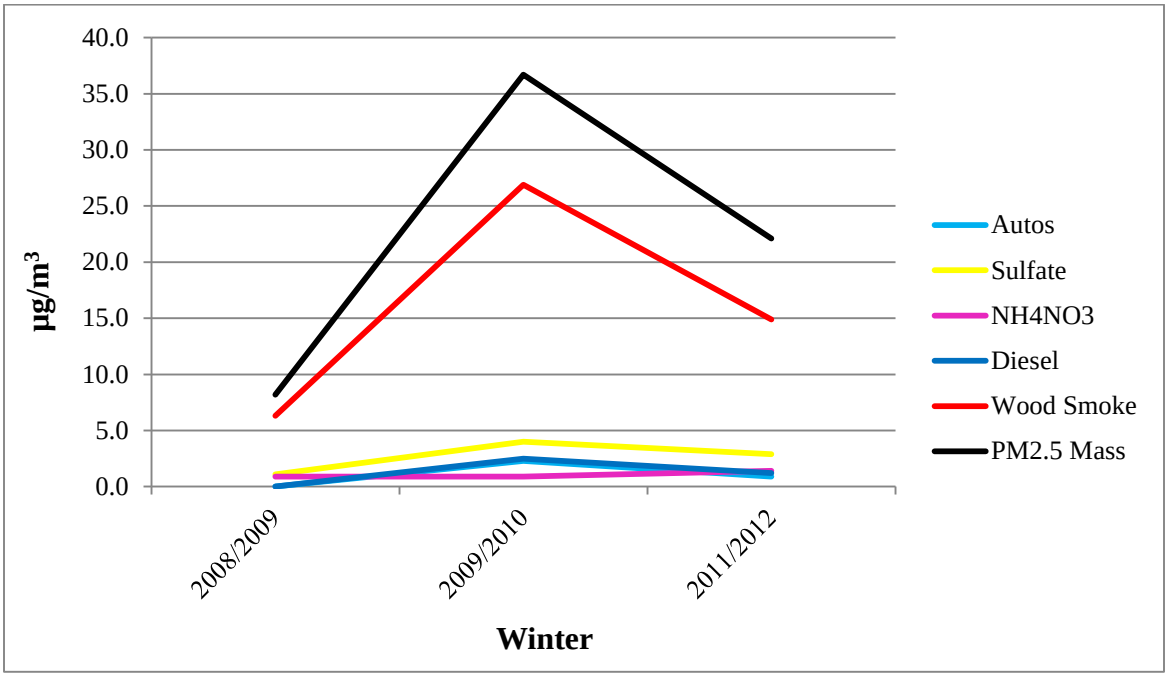

Figure 4: Peger Road Source Contribution Estimates (µg/m³) – EPA profiles.

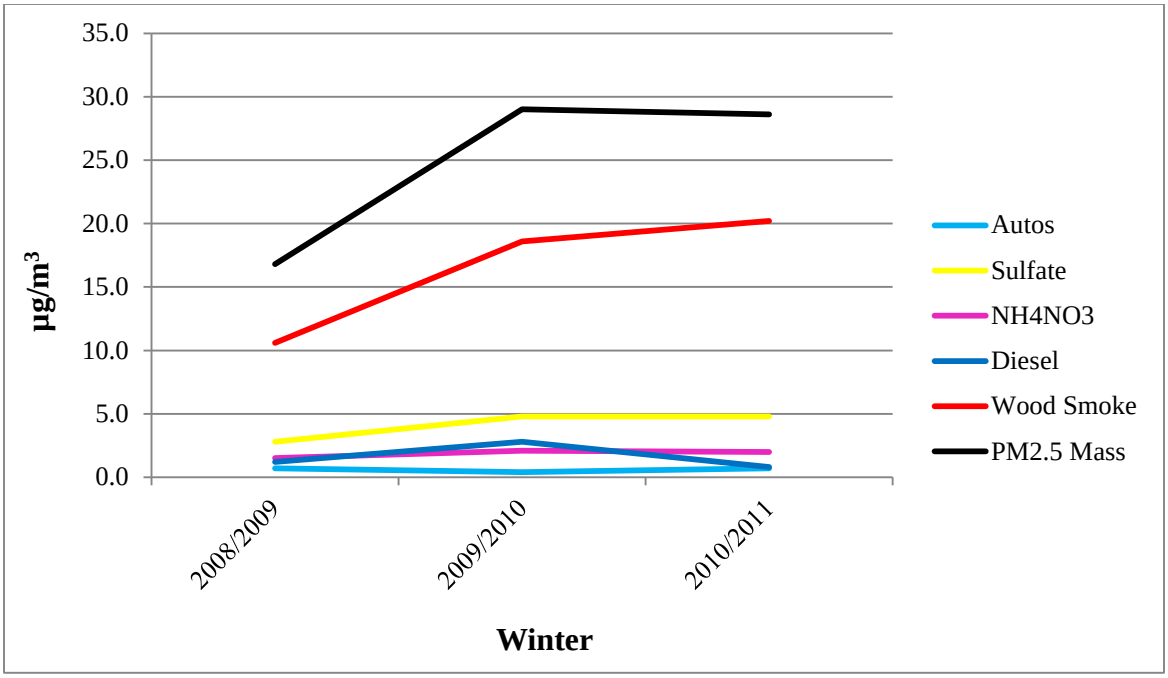

Figure 5: NCORE Source Contribution Estimates (µg/m³) – EPA profiles.

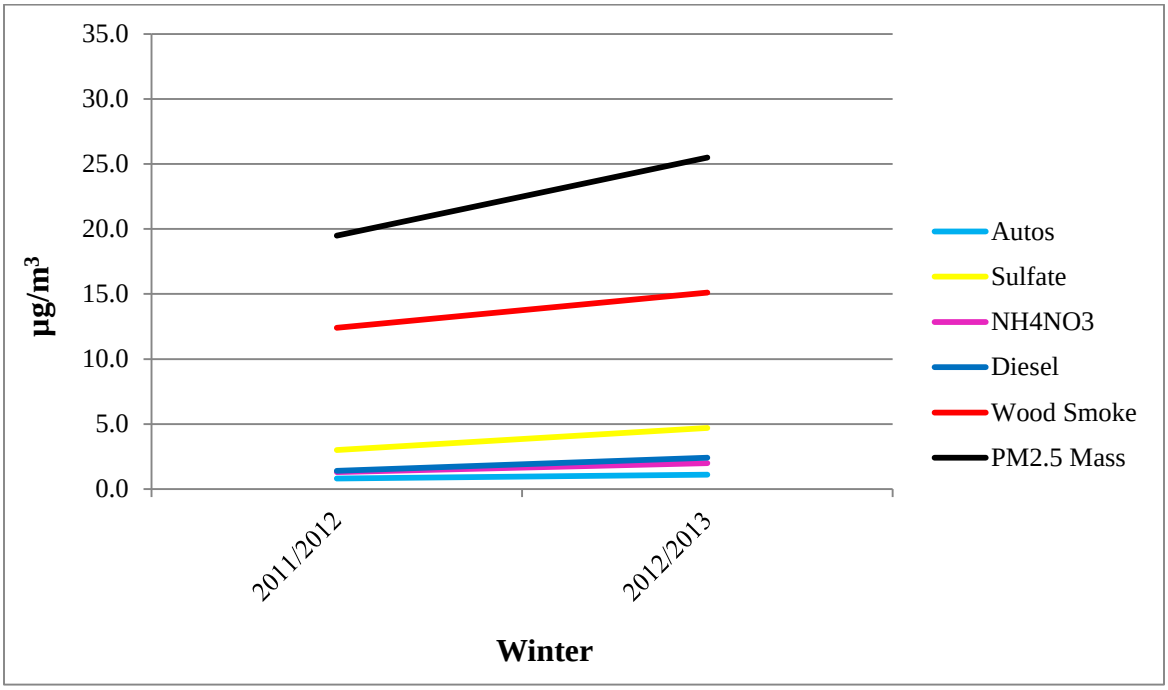

Figure 6: NPF3 Source Contribution Estimates (µg/m³) – EPA profiles.

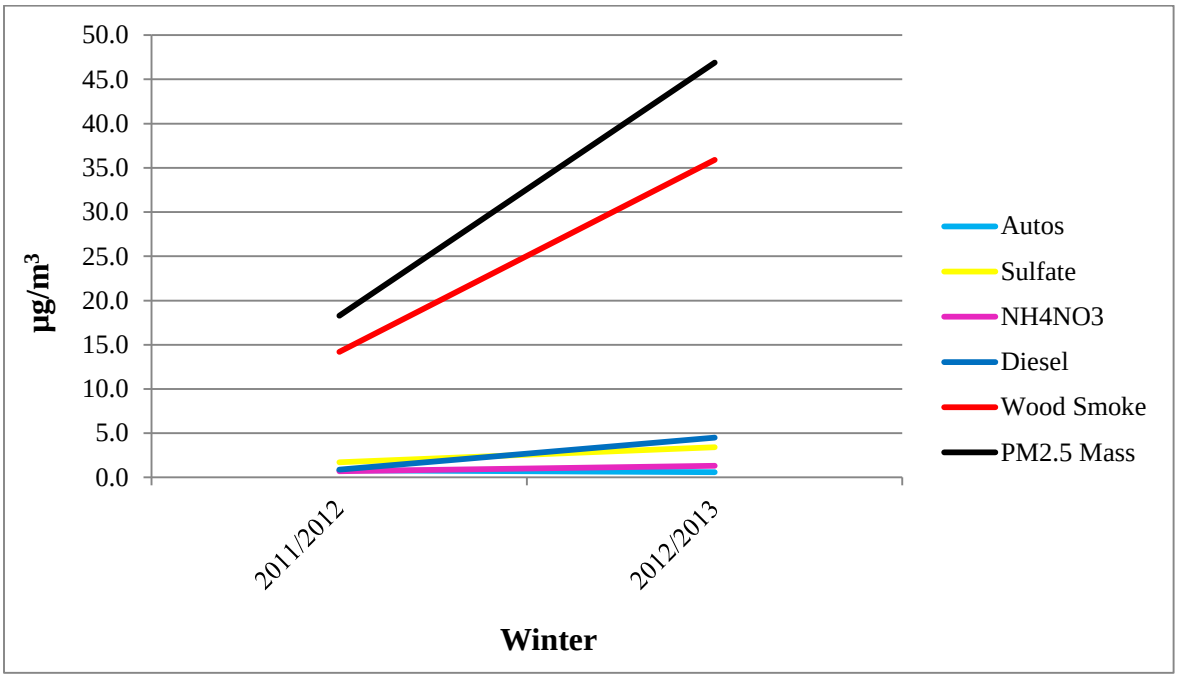

Table 14: Source Contribution Estimates ± Standard Errors (µg/m^3) – OMNI Profiles.
Note that percentages in parentheses are percent contributions to overall ambient $PM_{2.5}$ mass.

	Sulfate	Ammonium Nitrate	Diesel	Autos	Wood Smoke	No. 2 Fuel Oil	Unexplained	$PM_{2.5}$ Mass	n	Sampling Dates
State Building 2005/2006	2.4±0.5 (12.8 %)	1.3 ±0.3 (6.7 %)	0.4±0.2 (2.3 %)	Not Detected	5.9±1.6 (31.7 %)	8.4±1.6 (44.7 %)	0.4 (1.9 %)	18.9	36	11/3/05-3/30/06
State Building 2006/2007	2.0±0.4 (10.1 %)	1.1 ±0.3 (5.7 %)	0.2±0.1 (0.9 %)	0.3±0.1 (1.5 %)	7.3±1.9 (36.6 %)	9.0±1.7 (45.0 %)	0.03 (0.1 %)	19.9	39	11/1/06-3/31/07
State Building 2007/2008	1.9±0.4 (10.0 %)	1.0 ±0.3 (5.5 %)	1.0±0.4 (5.5 %)	0.3±0.1 (1.6 %)	5.9±1.5 (31.9 %)	8.4±1.5 (45.4 %)	0.01 (0.1 %)	18.7	40	11/2/07-3/31/08
2008/2009	**Sulfate**	**Ammonium Nitrate**	**Diesel**	**Autos**	**Wood Smoke**	**No. 2 Fuel Oil**	**Unexplained**	**$PM_{2.5}$ Mass**	**n**	**Sampling Dates**
*State Building	4.4±0.6 (17.9 %)	1.9 ±0.6 (7.9 %)	Not Detected	Not Detected	13.8±1.7 (56.0 %)	3.5±0.7 (14.2 %)	1.0 (4.0 %)	25.3	47	11/8/08-4/7/09
**State Building	2.5±0.5 (10.4 %)	1.2 ±0.3 (5.2 %)	0.04 ±0.02 (0.1 %)	0.06 ±0.03 (0.3 %)	8.7±1.9 (36.1 %)	11.4±1.8 (47.4 %)	0.1 (0.5 %)	24.4	46	11/8/08-4/7/09
North Pole	1.4±0.2 (7.6 %)	0.9 ±0.2 (4.7 %)	Not Detected	Not Detected	13.6±1.2 (73.4 %)	2.1±0.5 (11.1 %)	0.6 (3.3 %)	18.9	21	1/25/09-4/7/09
RAMS	0.8±0.1 (9.2 %)	0.8 ±0.1 (9.2 %)	Not Detected	Not Detected	5.4±0.8 (63.9 %)	1.4±0.4 (16.8 %)	0.1 (0.9 %)	8.3	22	1/25/09-4/7/09
*Peger Road	2.0±0.3 (11.7 %)	1.4 ±0.3 (8.4 %)	Not Detected	Not Detected	8.6±1.2 (51.0 %)	4.6±0.9 (27.2 %)	0.3 (1.6 %)	16.8	26	1/25/09-4/7/09
**Peger Road	1.6±0.3 (9.6 %)	1.2 ±0.2 (7.3 %)	0.1±0.04 (0.5 %)	0.3±0.1 (1.7 %)	7.1±1.4 (42.0 %)	6.6±1.3 (38.7 %)	0.04 (0.3 %)	16.8	26	1/25/09-4/7/09
2009/2010	**Sulfate**	**Ammonium Nitrate**	**Diesel**	**Autos**	**Wood Smoke**	**No. 2 Fuel Oil**	**Unexplained**	**$PM_{2.5}$ Mass**	**n**	**Sampling Dates**
State Building	2.2±0.5 (9.3 %)	1.6 ±0.3 (6.5 %)	0.4±0.1 (1.8 %)	0.4±0.1 (1.4 %)	8.7±2.0 (36.0 %)	10.0±1.8 (41.1 %)	1.0 (3.9 %)	24.5	31	11/3/09-3/15/10
North Pole	1.1±0.2 (3.2 %)	0.9 ±0.2 (2.6 %)	1.5±0.4 (4.3 %)	1.0±0.4 (2.9 %)	22.4±2.1 (65.1 %)	7.3±0.9 (21.3 %)	0.2 (0.6 %)	33.7	35	11/3/09-3/15/10
RAMS	1.8±0.4 (4.9 %)	0.9 ±0.2 (2.5 %)	0.8±0.3 (2.3 %)	0.9±0.4 (2.5 %)	21.0±2.2 (57.2 %)	11.2±1.4 (30.5 %)	0.1 (0.1 %)	36.7	29	11/15/09-3/15/10
Peger Road	2.3±0.5 (7.8 %)	1.9 ±0.4 (6.4 %)	1.7±0.5 (5.7 %)	0.4±0.2 (1.4 %)	9.2±2.5 (31.2 %)	13.7±2.1 (46.3 %)	0.3 (1.2 %)	29.5	37	11/3/09-3/15/10

2010/2011	**Sulfate**	**Ammonium Nitrate**	**Diesel**	**Autos**	**Wood Smoke**	**No. 2 Fuel Oil**	**Unexplained**	**$PM_{2.5}$ Mass**	**n**	**Sampling Dates**
State Building	2.0±0.4 (9.8 %)	1.3 ±0.3 (6.6 %)	0.2±0.04 (0.9 %)	0.2±0.1 (1.1 %)	6.5±1.7 (32.7 %)	8.3±1.5 (41.5 %)	1.5 (7.5 %)	20.2	15	11/1/10-2/8/11
North Pole	1.0±0.2 (3.9 %)	0.7 ±0.1 (2.7 %)	0.9±0.3 (3.3 %)	1.9±0.5 (7.1 %)	16.6±1.9 (62.5 %)	5.3±0.8 (20.0 %)	0.2 (0.6 %)	26.8	10	1/9/11-2/5/11
Peger Road	2.1±0.5 (7.3 %)	2.0 ±0.4 (6.7 %)	1.0±0.3 (3.3 %)	0.6±0.2 (2.2 %)	9.5±2.6 (32.7 %)	13.5±2.1 (46.4 %)	0.4 (1.3 %)	28.6	10	1/9/11-2/5/11
2011/2012	**Sulfate**	**Ammonium Nitrate**	**Diesel**	**Autos**	**Wood Smoke**	**No. 2 Fuel Oil**	**Unexplained**	**$PM_{2.5}$ Mass**	**n**	**Sampling Dates**
State Building	2.2±0.4 (11.0 %)	1.0 ±0.3 (5.1 %)	0.5±0.1 (2.3 %)	0.8±0.2 (4.3 %)	7.6±1.6 (38.5 %)	6.4±1.5 (32.2 %)	1.3 (6.6 %)	19.5	36	11/2/11-3/31/12
North Pole	1.2±0.2 (5.3 %)	0.5 ±0.1 (2.1 %)	None Detected	0.6±0.2 (2.4 %)	17.3±1.6 (75.4 %)	2.4±0.7 (10.3 %)	1.0 (4.5 %)	23.0	34	11/2/11-3/25/12
RAMS	1.9±0.4 (8.4 %)	1.0 ±0.3 (4.7 %)	0.3±0.1 (1.3 %)	0.9±0.4 (4.0 %)	11.5±1.9 (51.4 %)	4.9±1.5 (21.8 %)	1.9 (8.5 %)	22.7	15	12/20/11-2/27/12
NCORE	2.0±0.4 (10.5 %)	0.9 ±0.3 (4.6 %)	0.2±0.1 (1.1 %)	0.4±0.2 (2.1 %)	10.1±1.7 (53.0 %)	5.4±1.4 (28.2 %)	0.1 (0.5 %)	19.3	42	11/2/11-3/31/12
NPF3	1.2±0.2 (6.4 %)	0.5 ±0.2 (2.7 %)	None Detected	None Detected	14.1±1.3 (76.6 %)	2.2±0.7 (12.1 %)	0.4 (2.2 %)	18.3	7	3/1/12-3/31/12
2012/2013	**Sulfate**	**Ammonium Nitrate**	**Diesel**	**Autos**	**Wood Smoke**	**No. 2 Fuel Oil**	**Unexplained**	**$PM_{2.5}$ Mass**	**n**	**Sampling Dates**
State Building	2.9±0.5 (13.3 %)	1.3 ±0.4 (6.1 %)	0.2±0.1 (0.9 %)	0.4±0.2 (2.0 %)	8.7±1.8 (40.1 %)	6.0±1.5 (27.6 %)	2.1 (9.9 %)	21.8	29	11/2/12-3/29/13
NPE	1.5±0.3 (5.4 %)	0.6 ±0.1 (2.0 %)	0.8±0.2 (2.8 %)	0.8±0.2 (2.9 %)	18.8±1.8 (66.6 %)	4.9±1.1 (17.1 %)	0.9 (3.1 %)	27.8	40	11/2/12-3/29/13
NCORE	3.0±0.5 (12.1 %)	1.3 ±0.3 (5.2 %)	0.4±0.1 (1.5 %)	0.7±0.2 (2.6 %)	11.0±2.0 (44.2 %)	8.5±1.8 (34.1 %)	0.1 (0.2 %)	25.1	39	11/2/12-3/29/13
NPF3	2.2±0.4 (4.8 %)	0.6 ±0.1 (1.3 %)	0.4±0.1 (1.0 %)	0.1±0.03 (0.2 %)	34.7±2.3 (75.2 %)	6.4±1.3 (13.8 %)	1.8 (3.8 %)	46.9	42	11/2/12-3/29/13

ND: not detected by the CMB model. Sampling was not conducted at the RAMS site during the winter of 2010/2011. *CMB results originally presented in the Final Report submitted to ADEC (dated July 23, 2012). **Updated CMB modeling was conducted.

Table 15: Source Contribution Estimates ± Standard Errors (µg/m^3) – Summer 2012 OMNI Profiles.

Summer 2012	Sulfate	Ammonium Nitrate	Diesel	Autos	Street Sand	Wood Smoke	Unexplained	$PM_{2.5}$ Mass	n	Sampling Dates
State Building	0.4±0.05 (6.5 %)	0.2±0.05 (3.9 %)	0.02±0.01 (0.4 %)	0.3±0.1 (4.5 %)	0.3±0.1 (4.6 %)	3.6±0.1 (64.3 %)	0.9 (15.8 %)	5.7	20	6/2/12-8/31/12
NCORE	0.4±0.05 (6.0 %)	0.2±0.05 (3.8 %)	0.2±0.03 (2.7 %)	0.3±0.1 (5.7 %)	0.2±0.1 (3.7 %)	4.2±0.4 (70.5 %)	0.5 (7.7 %)	5.1	17	6/14/12-8/31/12

Figure 7: State Building Source Contribution Estimates (µg/m³) – OMNI profiles.

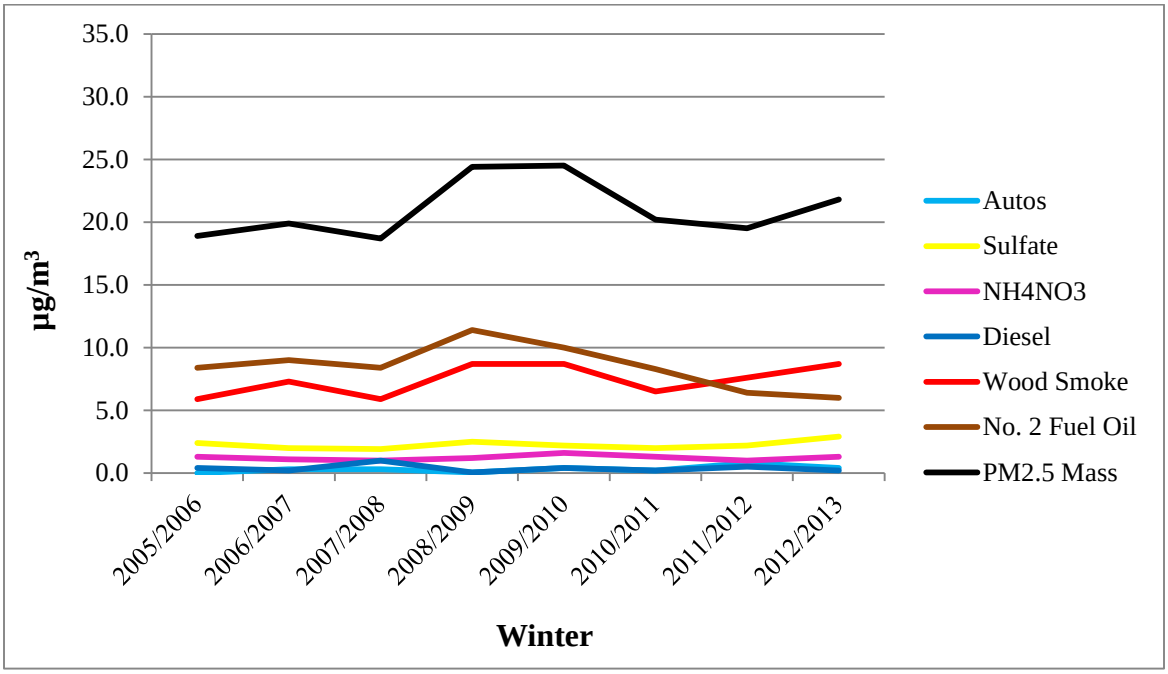

Figure 8: North Pole Source Contribution Estimates (µg/m³) – OMNI profiles.

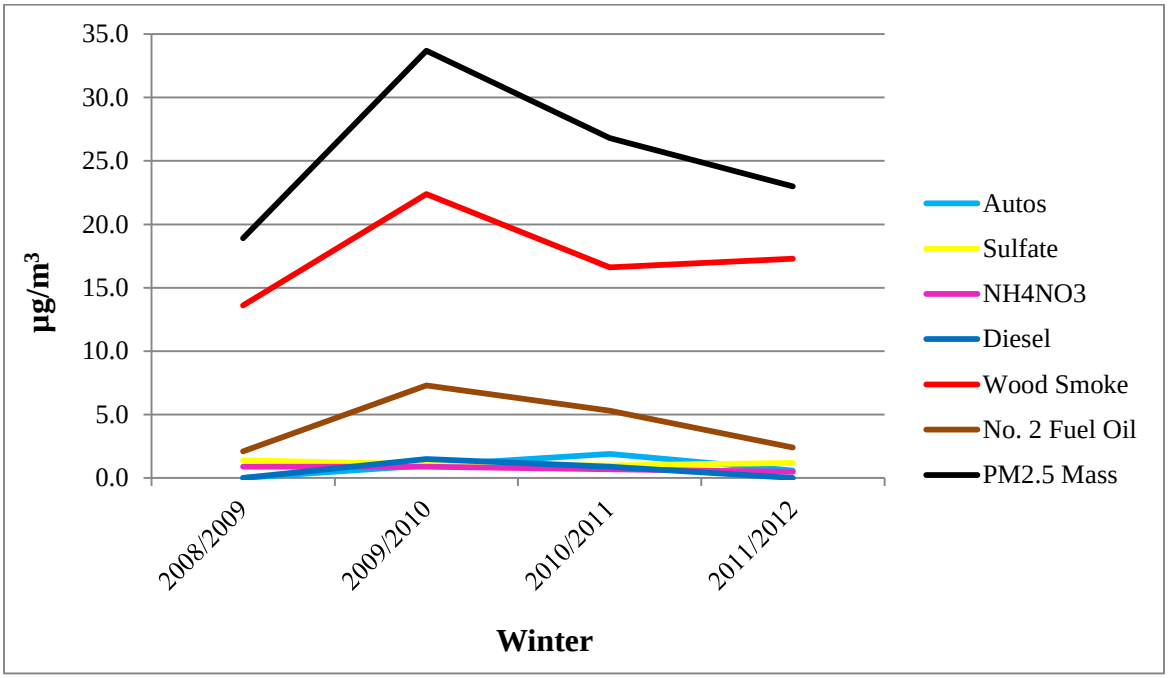

Figure 9: RAMS Source Contribution Estimates (µg/m^3) – OMNI profiles.

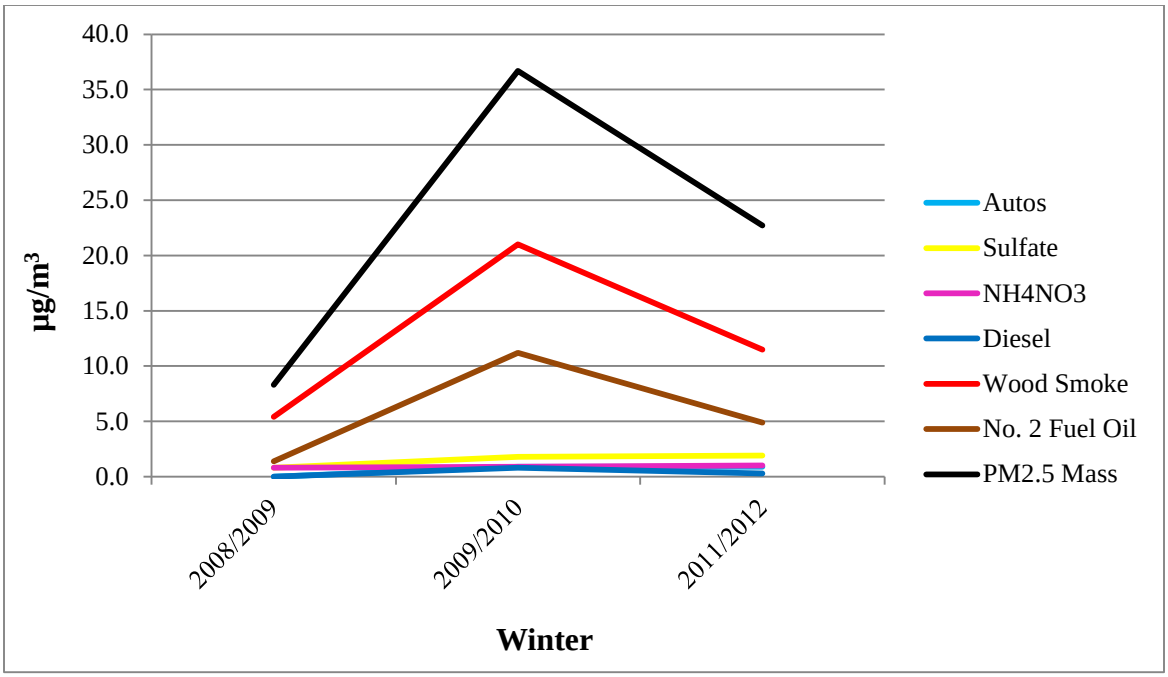

Figure 10: Peger Road Source Contribution Estimates (µg/m^3) – OMNI profiles.

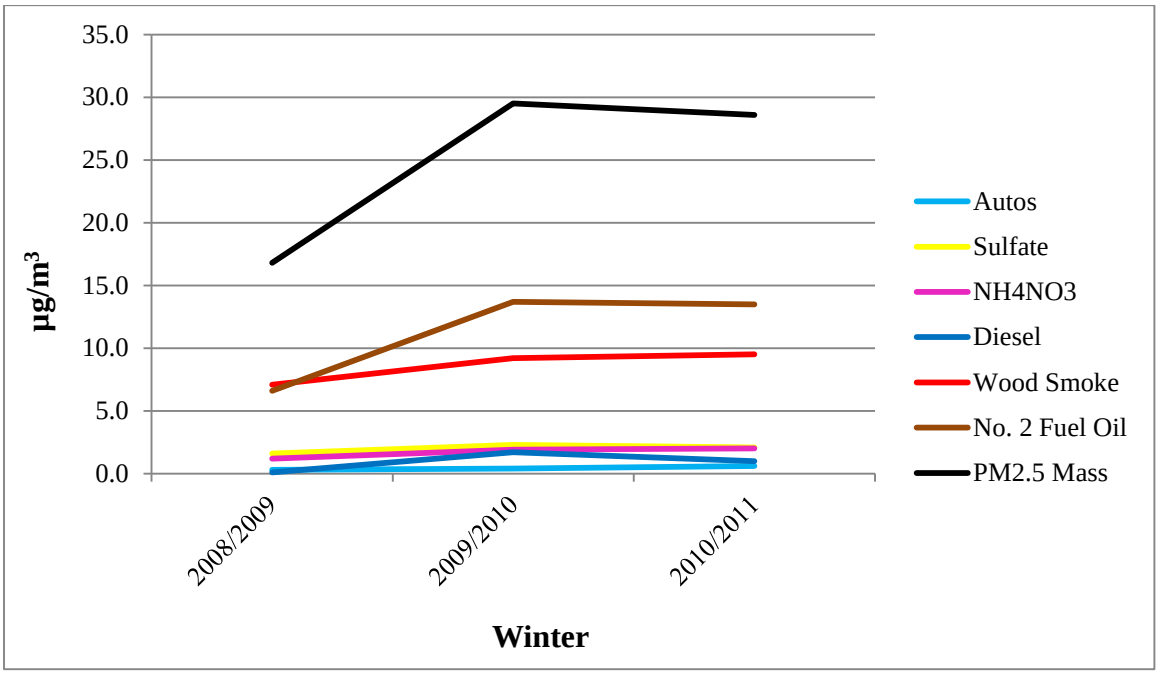

Figure 11: NCORE Source Contribution Estimates (µg/m^3) – OMNI profiles.

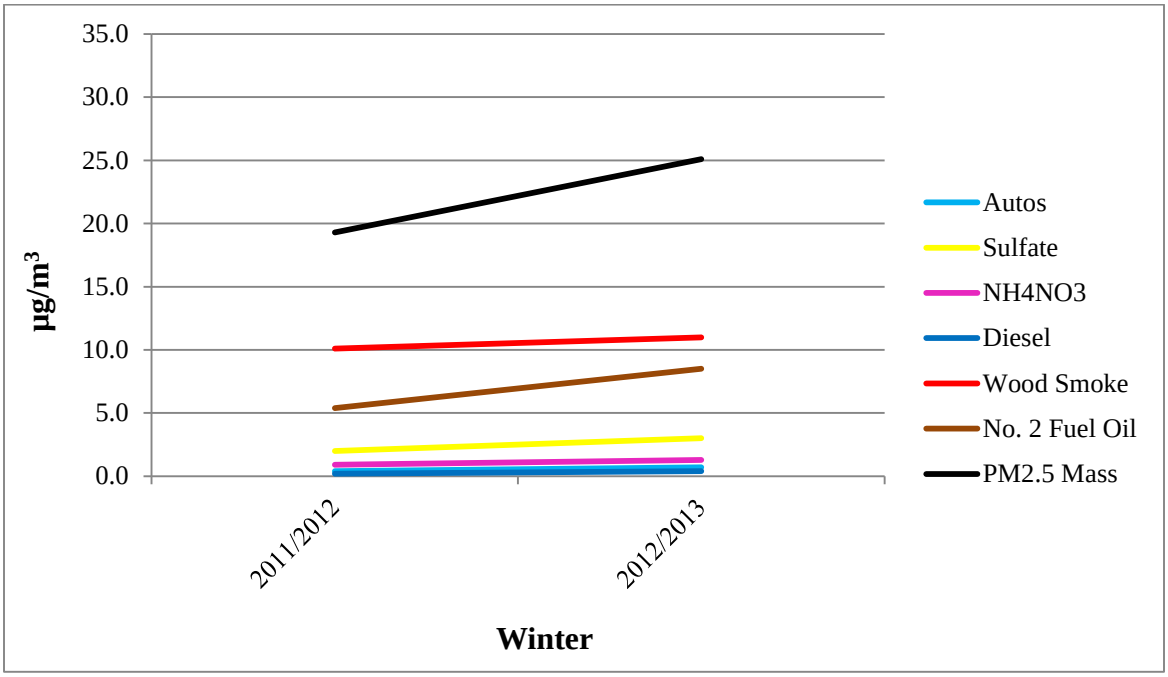

Figure 12: NPF3 Source Contribution Estimates (µg/m^3) – OMNI profiles.

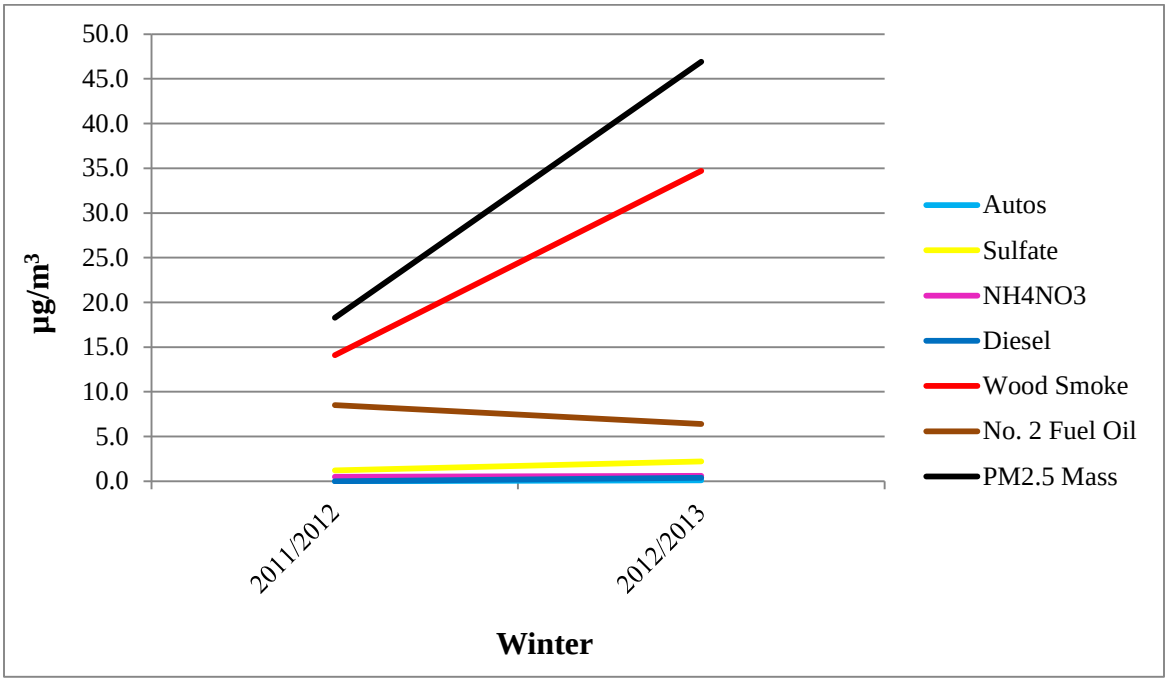

Figure 13: Winter 2005/2006, State Building.
CMB Results with EPA Source Profiles, November 3, 2005 – March 30, 2006.

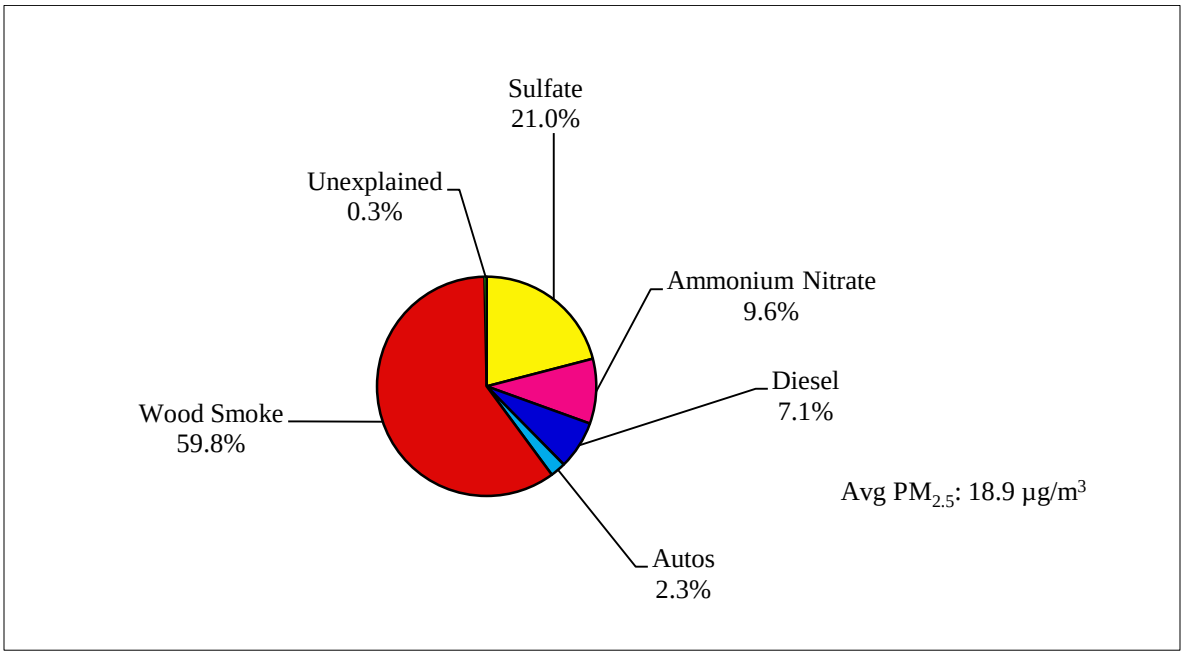

Figure 14: Winter 2005/2006, State Building.
CMB Results with OMNI Source Profiles, November 3, 2005 – March 30, 2006.

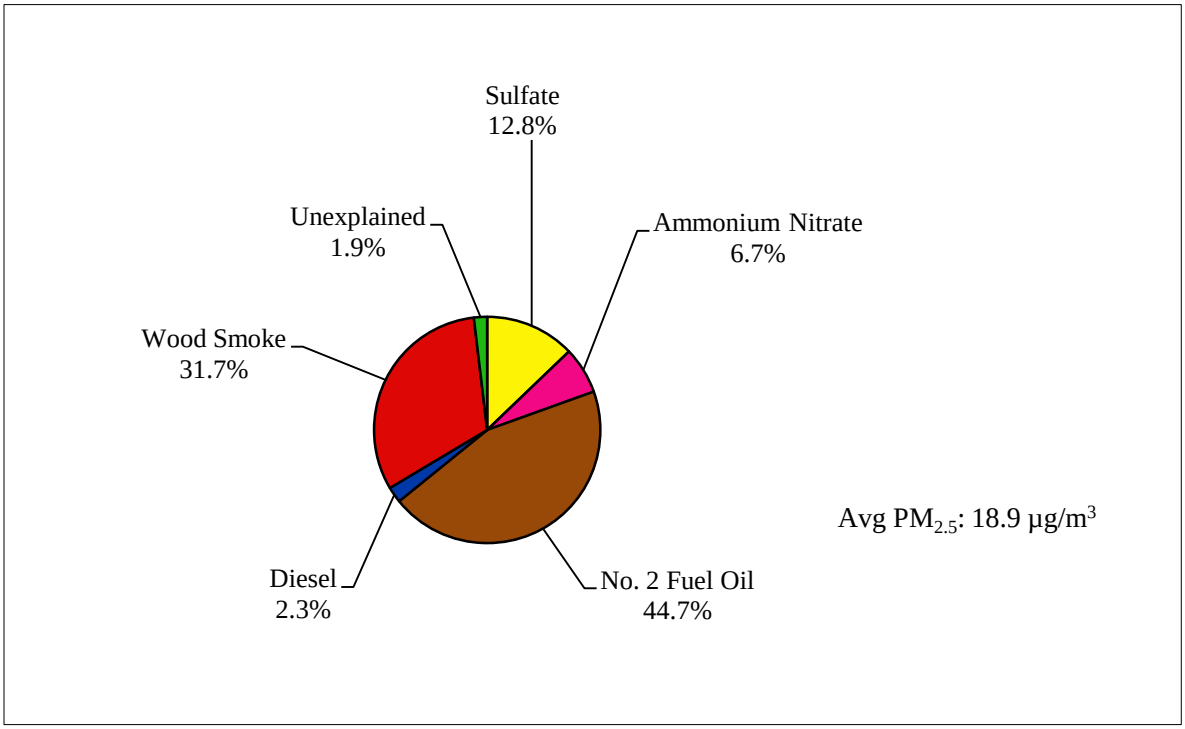

Table 16: Comparison of CMB Results - EPA and OMNI Source Profiles. State Building, Winter 2005/2006.

Season:	**Winter 2005/2006 (EPA)**	**Winter 2005/2006 (OMNI)**
Dates:	11/3/05-3/30/06	11/3/05-3/30/06
n:	36	36
$PM_{2.5}$ Mass (µg/m^3):	18.9	18.9
CMB Source Estimates (µg/m^3 and %)		
Sulfate:	4.0 (21.0 %)	2.4 (12.8 %)
Ammonium Nitrate:	1.8 (9.6 %)	1.3 (6.7%)
Diesel:	1.3 (7.1 %)	0.4 (2.3%)
Automobiles:	0.4 (2.3 %)	Not Identified
Wood Smoke:	11.3 (59.8 %)	5.9 (31.7 %)
No. 2 Fuel Oil:	Not Identified	8.4 (44.7 %)
Unexplained:	0.1 (0.3 %)	0.4 (1.9 %)

Figure 15: Winter 2006/2007, State Building.
CMB Results with EPA Source Profiles, November 1, 2006 – March 31, 2007.

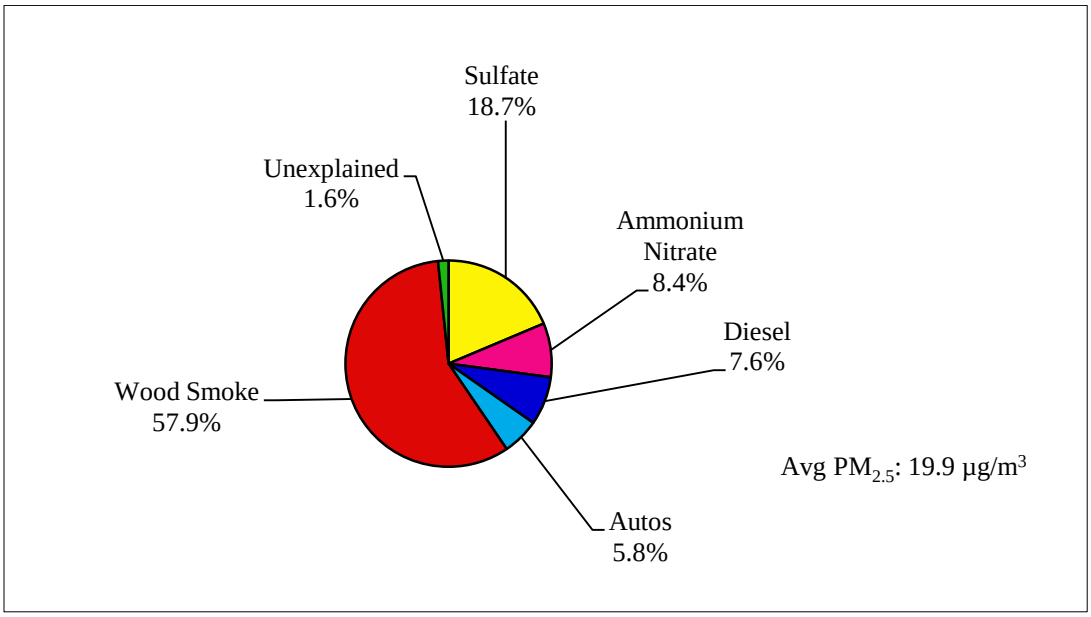

Figure 16: Winter 2006/2007, State Building.
CMB Results with OMNI Source Profiles, November 1, 2006 – March 31, 2007.

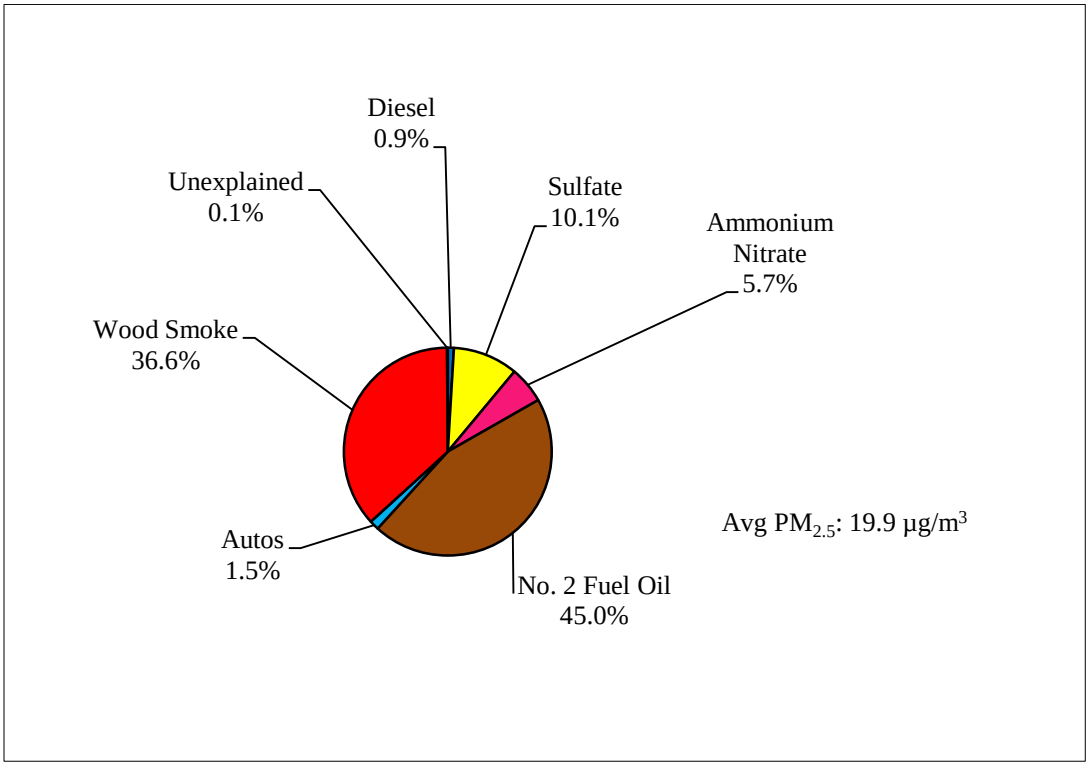

Table 17: Comparison of CMB Results - EPA and OMNI Source Profiles. State Building, Winter 2006/2007.

Season:	**Winter 2006/2007 (EPA)**	**Winter 2006/2007 (OMNI)**
Dates:	11/1/06-3/31/07	11/1/06-3/31/07
n:	39	39
$PM_{2.5}$ Mass (µg/m^3):	19.9	19.9
CMB Source Estimates (µg/m^3 and %)		
Sulfate:	3.7 (18.7 %)	2.0 (10.1 %)
Ammonium Nitrate:	1.7 (8.4 %)	1.1 (5.7 %)
Diesel:	1.5 (7.6 %)	0.2 (0.9 %)
Automobiles:	1.1 (5.8 %)	0.3 (1.5 %)
Wood Smoke:	11.5 (57.9 %)	7.3 (36.6 %)
No. 2 Fuel Oil:	Not Identified	9.0 (45.0 %)
Unexplained:	0.3 (1.6 %)	0.03 (0.1 %)

Figure 17: Winter 2007/2008, State Building.
CMB Results with EPA Source Profiles, November 2, 2007 – March 31, 2008.

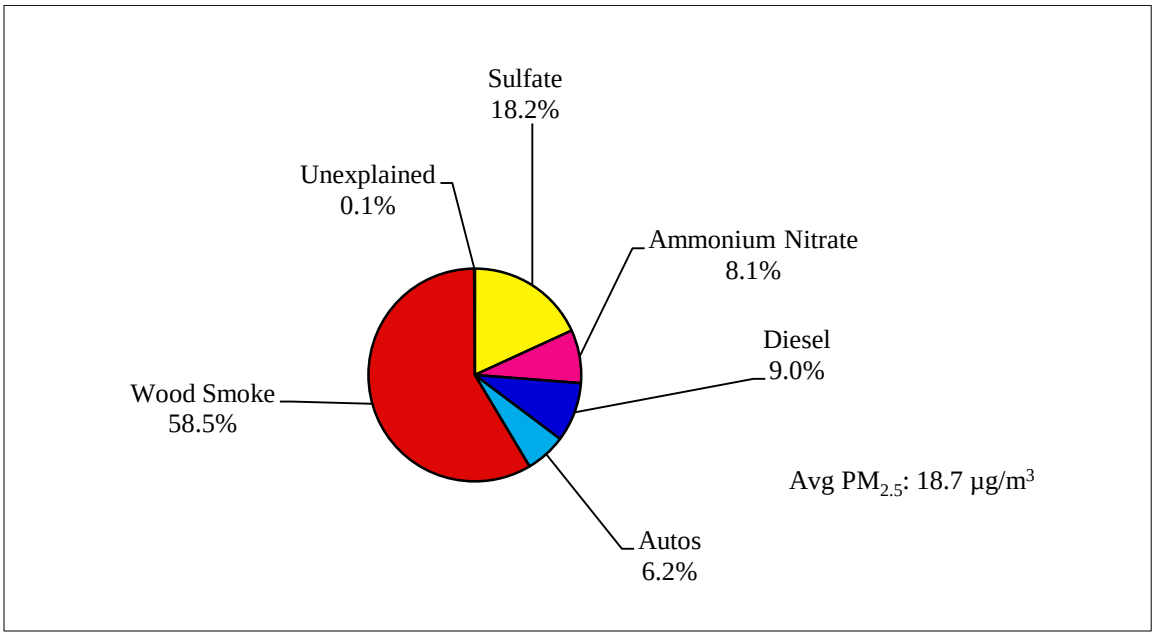

Figure 18: Winter 2007/2008, State Building.
CMB Results with OMNI Source Profiles, November 2, 2007 – March 31, 2008.

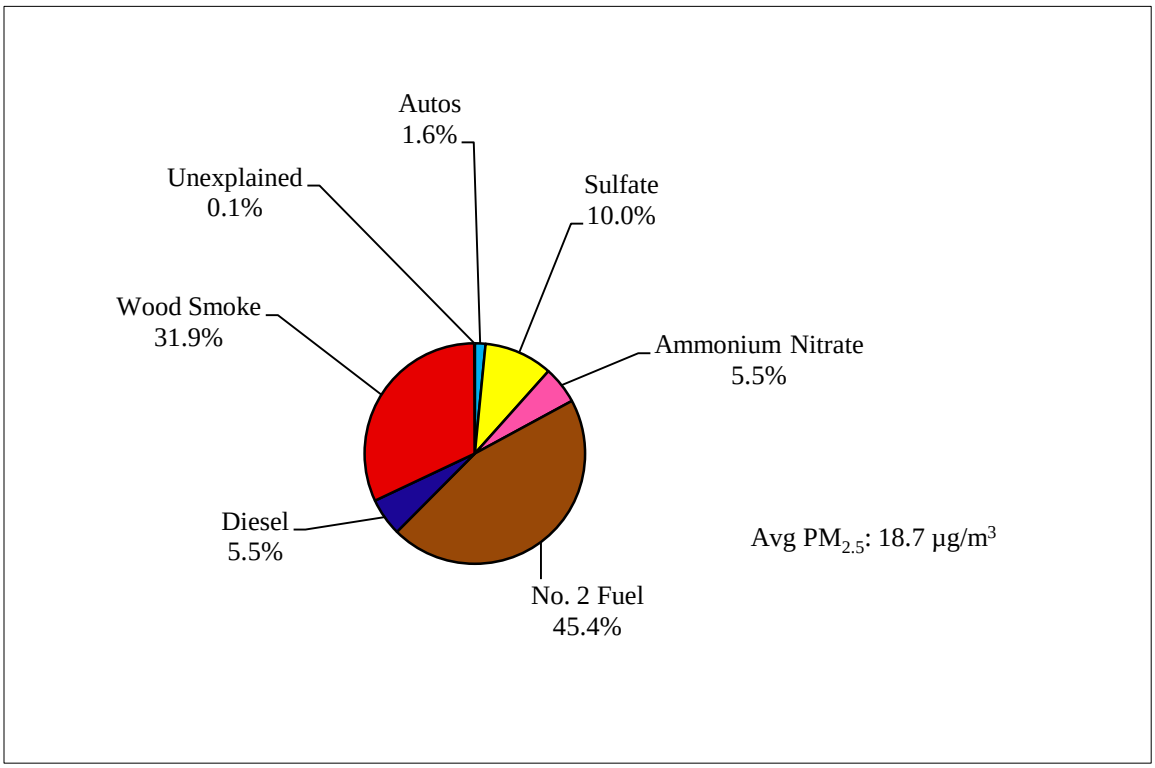

Table 18: Comparison of CMB Results - EPA and OMNI Source Profiles. State Building, Winter 2007/2008.

Season:	**Winter 2007/2008 (EPA)**	**Winter 2007/2008 (OMNI)**
Dates:	11/2/07-3/31/08	11/2/07-3/31/08
n:	40	40
$PM_{2.5}$ Mass (µg/m^3):	18.7	18.7
CMB Source Estimates (µg/m^3 and %)		
Sulfate:	3.4 (18.2 %)	1.9 (10.0 %)
Ammonium Nitrate:	1.5 (8.1 %)	1.0 (5.5 %)
Diesel:	1.7 (9.0 %)	1.0 (5.5 %)
Automobiles:	1.2 (6.2 %)	0.3 (1.6%)
Wood Smoke:	10.9 (58.5 %)	5.9 (31.9 %)
No. 2 Fuel Oil:	Not Identified	8.4 (45.4 %)
Unexplained:	0.02 (0.1 %)	0.01 (0.1 %)

Figure 19: Winter 2008/2009, State Building.
CMB Results with EPA Source Profiles, November 8, 2008 – April 7, 2009.

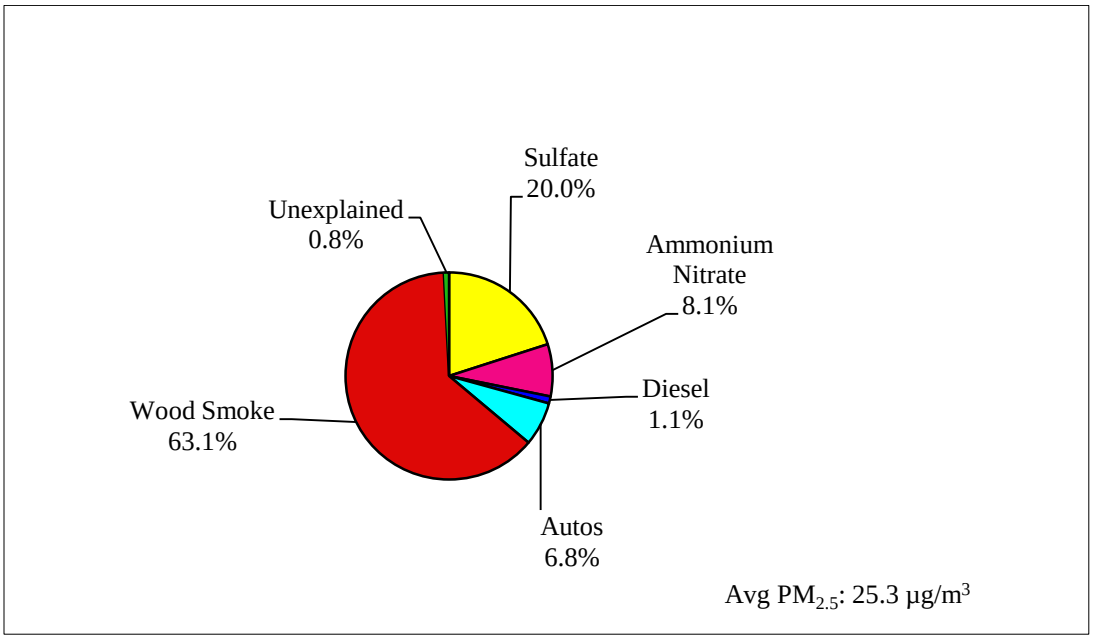

Figure 20: Winter 2008/2009, State Building.
CMB Results with OMNI Source Profiles, November 8, 2008 – April 7, 2009.
(Submitted originally to ADEC in July 23, 2012 final report).

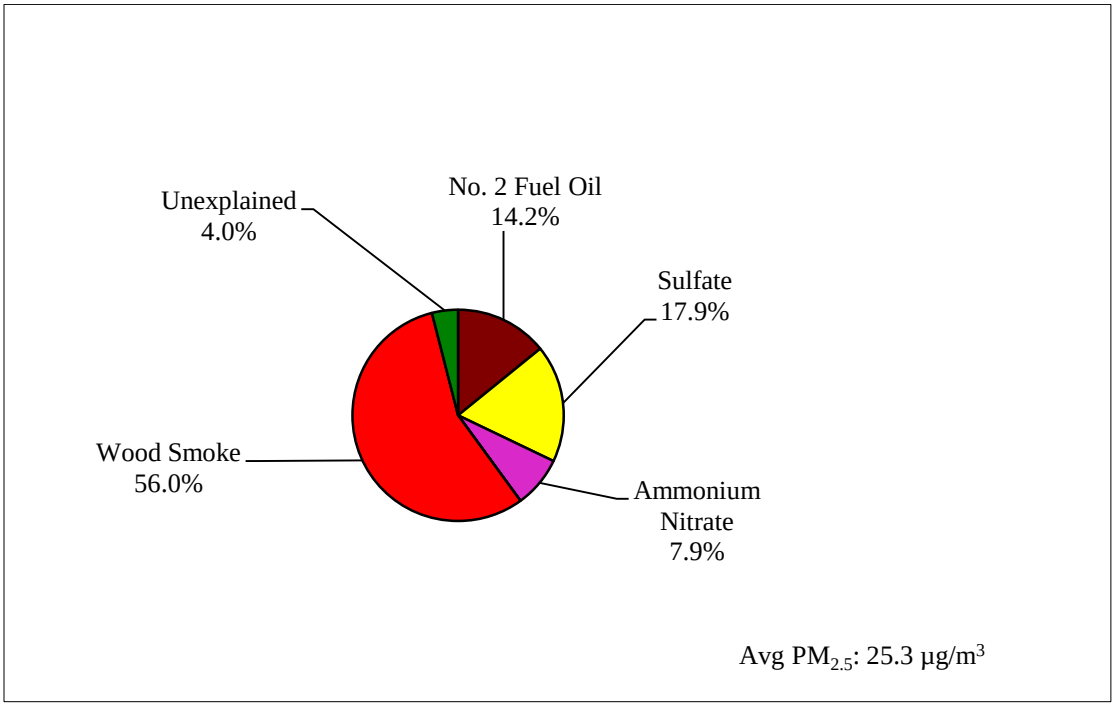

Figure 21: Winter 2008/2009, State Building.
CMB Results with OMNI Source Profiles, November 8, 2008 – April 7, 2009.
(Updated CMB modeling using OMNI profiles and auto / diesel profiles).

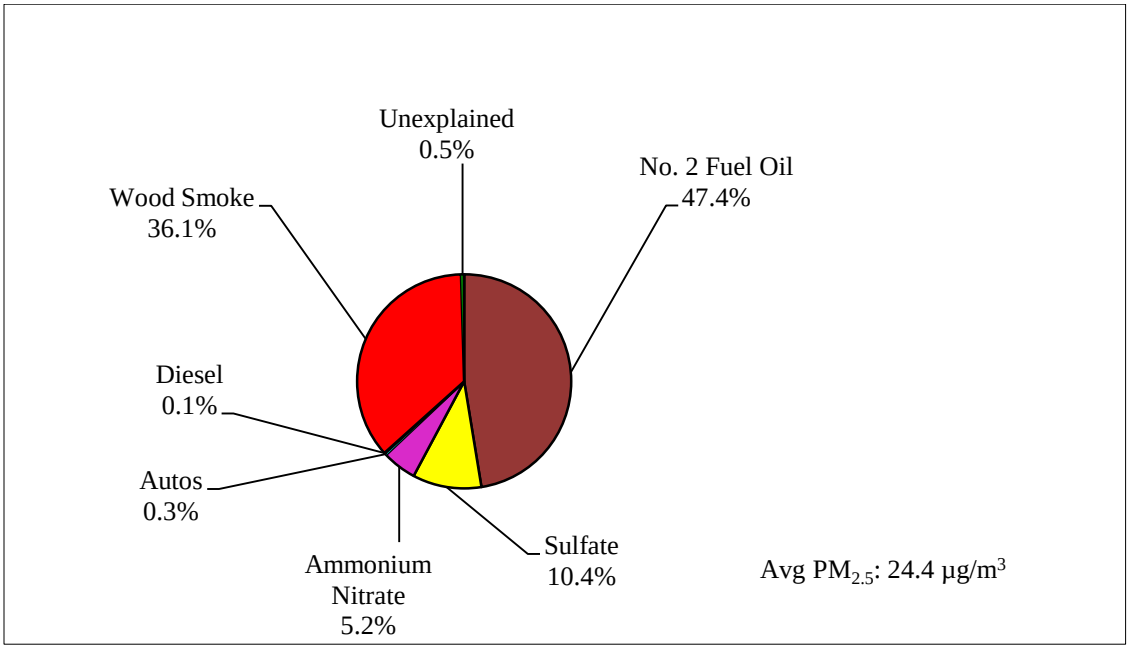

Table 19: Comparison of CMB Results - EPA and OMNI Source Profiles.
State Building, Winter 2008/2009.

Season:	**Winter 2008/2009 (EPA)**	**Winter 2008/2009 (OMNI)***	**Winter 2008/2009 (OMNI)****
Dates:	11/8/08-4/7/09	11/8/08-4/7/09	11/8/08-4/7/09
n:	47	47	46
$PM_{2.5}$ Mass (µg/m^3):	25.3	25.3	24.4
CMB Source Estimates (µg/m^3 and %)			
Sulfate:	5.1 (20.0 %)	4.4 (17.9 %)	2.5 (10.4 %)
Ammonium Nitrate:	2.1 (8.1 %)	1.9 (7.9%)	1.2 (5.2%)
Diesel:	0.3 (1.1 %)	Not Identified	0.04 (0.1 %)
Automobiles:	1.7 (6.8 %)	Not Identified	0.06 (0.3 %)
Wood Smoke:	16.0 (63.1 %)	13.8 (56.0 %)	8.7 (36.1 %)
No. 2 Fuel Oil:	Not Identified	3.5 (14.2 %)	11.4 (47.4 %)
Unexplained:	0.2 (0.8 %)	1.0 (4.0 %)	0.1 (0.5 %)

***Original OMNI CMB modeling (July 23, 2012 report). **Updated OMNI CMB modeling with autos and diesel profiles.**

Figure 22: Winter 2008/2009, North Pole.
CMB Results with EPA Source Profiles, January 25, 2009 – April 7, 2009.

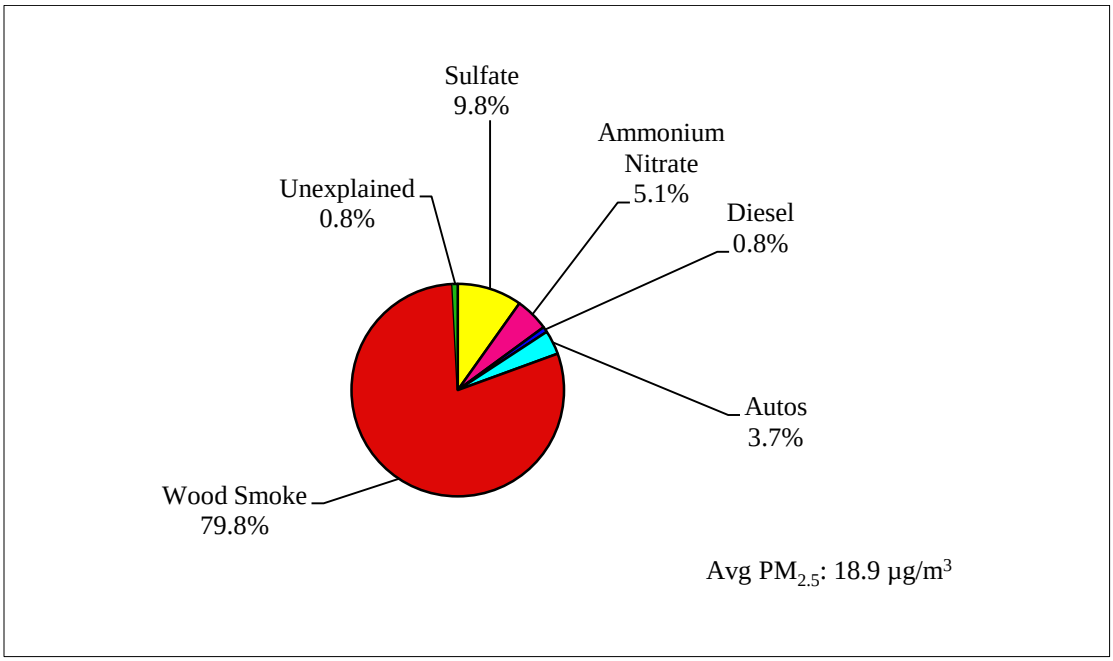

Figure 23: Winter 2008/2009, North Pole.
CMB Results with OMNI Source Profiles, January 25, 2009 – April 7, 2009.

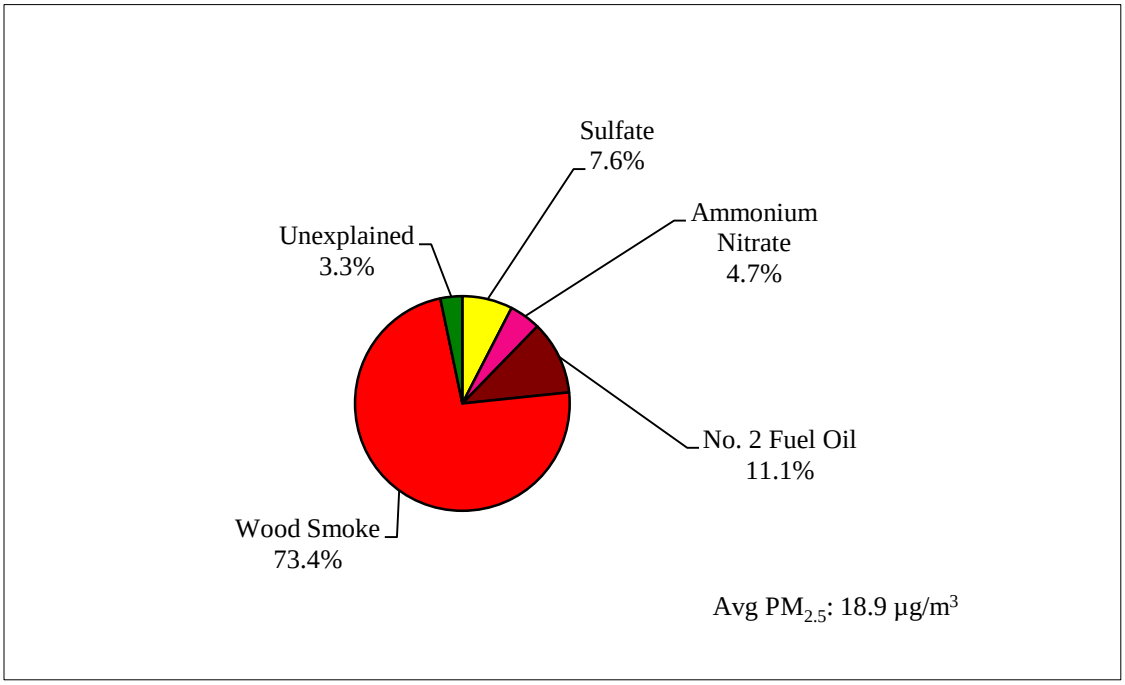

Table 20: Comparison of CMB Results - EPA and OMNI Source Profiles. North Pole, Winter 2008/2009.

Season:	**Winter 2008/2009 (EPA)**	**Winter 2008/2009 (OMNI)**
Dates:	1/25/09-4/7/09	1/25/09-4/7/09
n:	21	21
$PM_{2.5}$ Mass (µg/m^3):	18.9	18.9
CMB Source Estimates (µg/m^3 and %)		
Sulfate:	1.9 (9.8 %)	1.4 (7.6 %)
Ammonium Nitrate:	1.0 (5.1 %)	0.9 (4.7 %)
Diesel:	0.2 (0.8 %)	Not Identified
Automobiles:	0.7 (3.7 %)	Not Identified
Wood Smoke:	15.0 (79.8 %)	13.6 (73.4 %)
No. 2 Fuel Oil:	Not Identified	2.1 (11.1 %)
Unexplained:	0.2 (0.8 %)	0.6 (3.3 %)

Figure 24: Winter 2008/2009, RAMS.
CMB Results with EPA Source Profiles, January 25, 2009 – April 7, 2009.

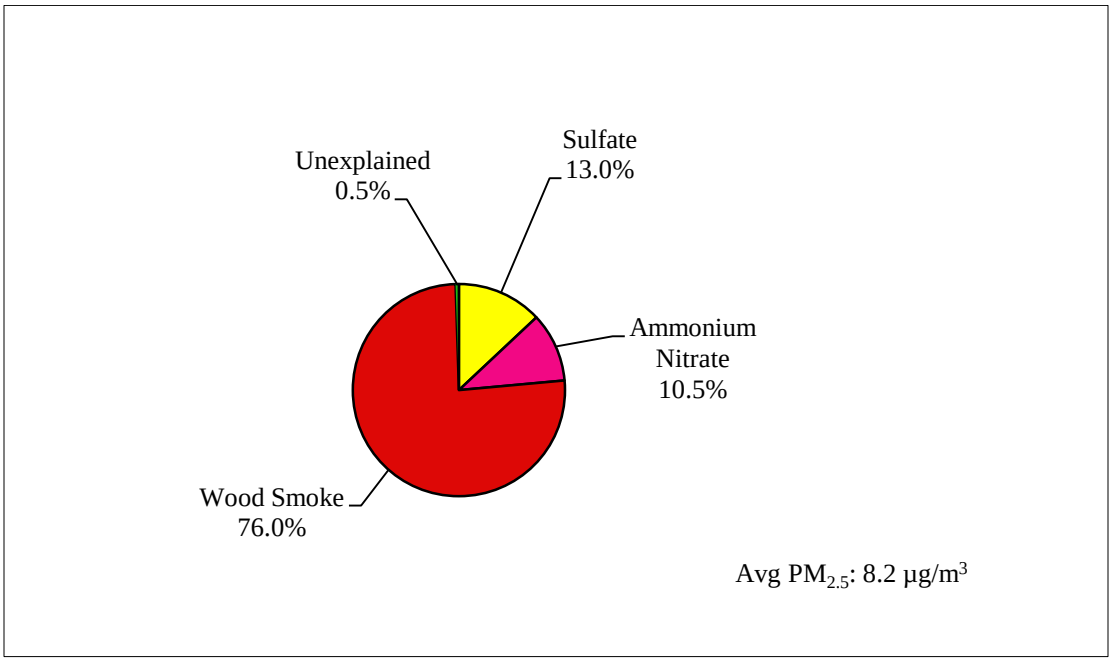

Figure 25: Winter 2008/2009, RAMS.
CMB Results with OMNI Source Profiles, January 25, 2009 – April 7, 2009.

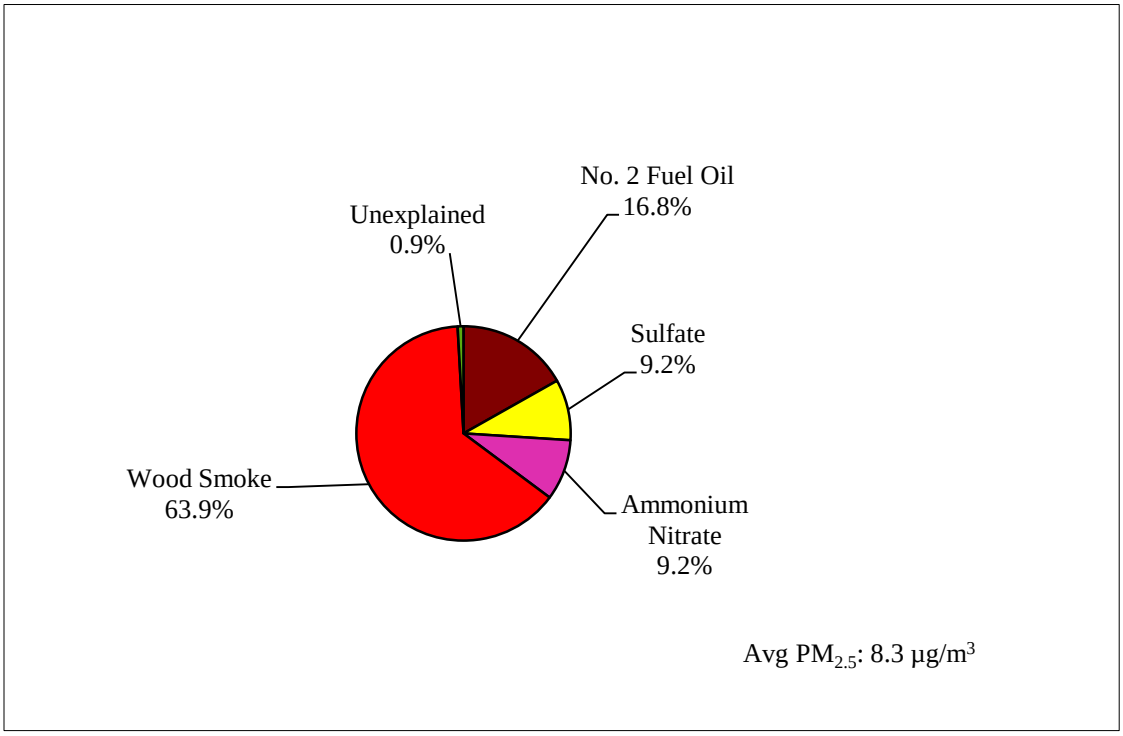

Table 21: Comparison of CMB Results - EPA and OMNI Source Profiles. RAMS, Winter 2008/2009.

Season:	**Winter 2008/2009 (EPA)**	**Winter 2008/2009 (OMNI)**
Dates:	1/25/09-4/7/09	1/25/09-4/7/09
n:	23	22
$PM_{2.5}$ Mass (µg/m^3):	8.2	8.3
CMB Source Estimates (µg/m^3 and %)		
Sulfate:	1.1 (13.0 %)	0.8 (9.2 %)
Ammonium Nitrate:	0.9 (10.5 %)	0.8 (9.2 %)
Diesel:	Not Identified	Not Identified
Automobiles:	Not Identified	Not Identified
Wood Smoke:	6.3 (76.0 %)	5.4 (63.9 %)
No. 2 Fuel Oil:	Not Identified	1.4 (16.8 %)
Unexplained:	0.04 (0.5 %)	0.1 (0.9%)

Figure 26: Winter 2008/2009, Peger Road.
CMB Results with EPA Source Profiles, January 25, 2009 – April 7, 2009.

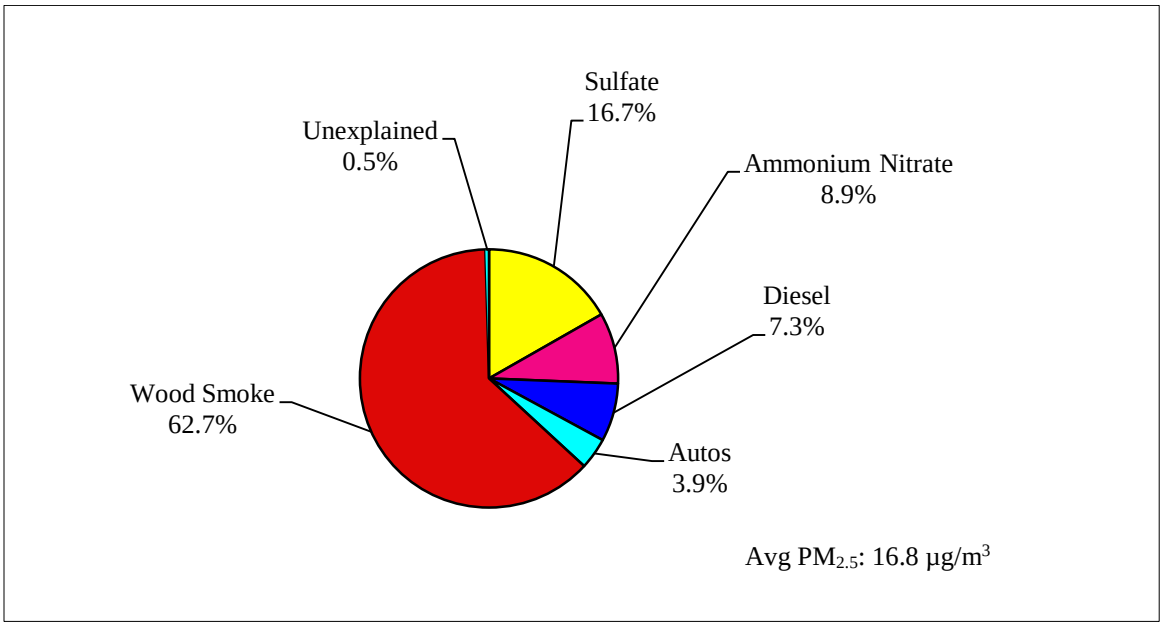

Figure 27: Winter 2008/2009, Peger Road.
CMB Results with OMNI Source Profiles, January 25, 2009 – April 7, 2009.
(Submitted originally to ADEC in July 23, 2012 final report).

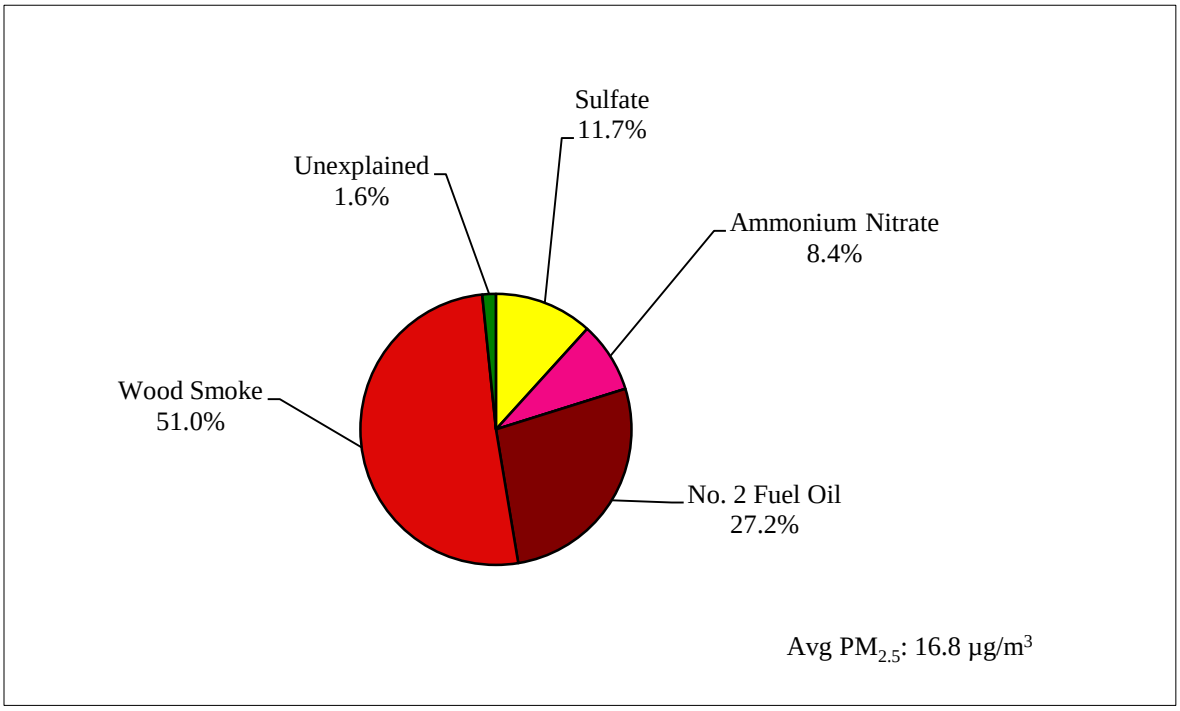

Figure 28: Winter 2008/2009, Peger Road.
CMB Results with OMNI Source Profiles, January 25, 2009 – April 7, 2009.
(Updated CMB modeling using OMNI profiles and auto / diesel profiles).

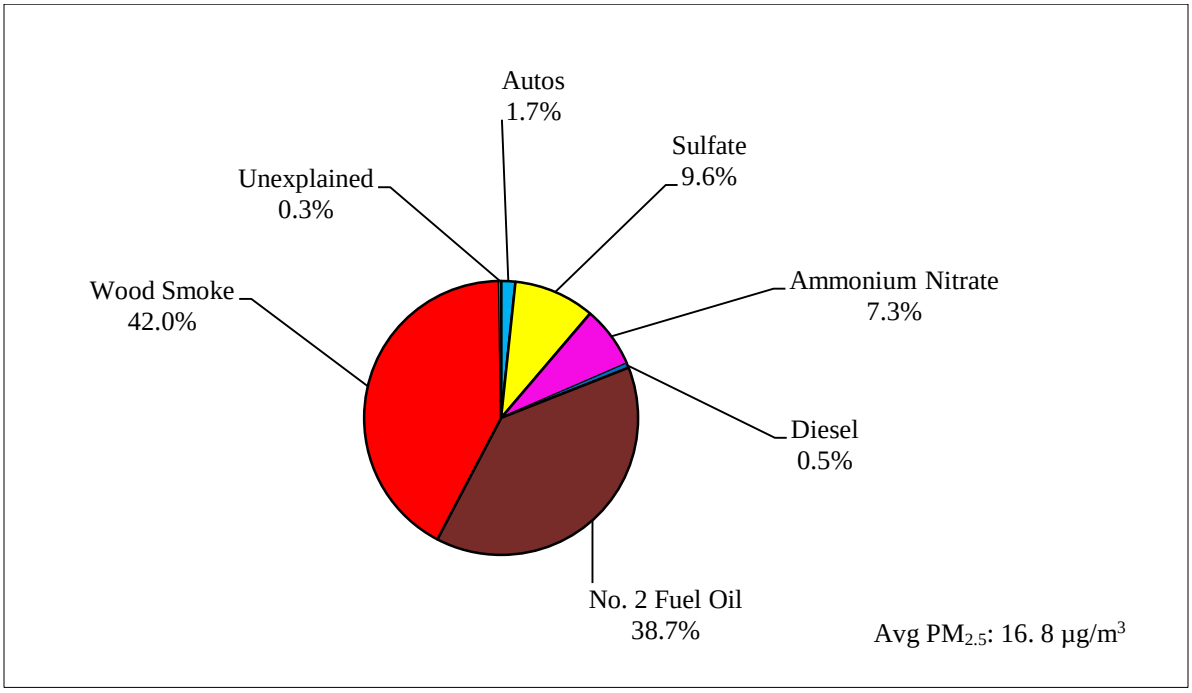

Table 22: Comparison of CMB Results - EPA and OMNI Source Profiles.
Peger Road, Winter 2008/2009.

Season:	**Winter 2008/2009 (EPA)**	**Winter 2008/2009 (OMNI)***	**Winter 2008/2009 (OMNI)****
Dates:	1/25/09-4/7/09	1/25/09-4/7/09	1/25/09-4/7/09
n:	26	26	26
$PM_{2.5}$ Mass (µg/m^3):	16.8	16.8	16.8
CMB Source Estimates (µg/m^3 and %)			
Sulfate:	2.8 (16.7 %)	2.0 (11.7 %)	1.6 (9.6 %)
Ammonium Nitrate:	1.5 (8.9 %)	1.4 (8.4 %)	1.2 (7.3 %)
Diesel:	1.2 (7.3 %)	Not Identified	0.1 (0.5 %)
Automobiles:	0.7 (3.9 %)	Not Identified	0.3 (1.7 %)
Wood Smoke:	10.6 (62.7 %)	8.6 (51.0 %)	7.1 (42.0 %)
No. 2 Fuel Oil:	Not Identified	4.6 (27.2 %)	6.6 (38.7 %)
Unexplained:	0.1 (0.5 %)	0.3 (1.6 %)	0.04 (0.3 %)

***Original OMNI CMB modeling (July 23, 2012 report). **Updated OMNI CMB modeling with autos and diesel profiles.**

Figure 29: Winter 2009/2010, State Building.
CMB Results with EPA Source Profiles, November 3, 2009–March 15, 2010.

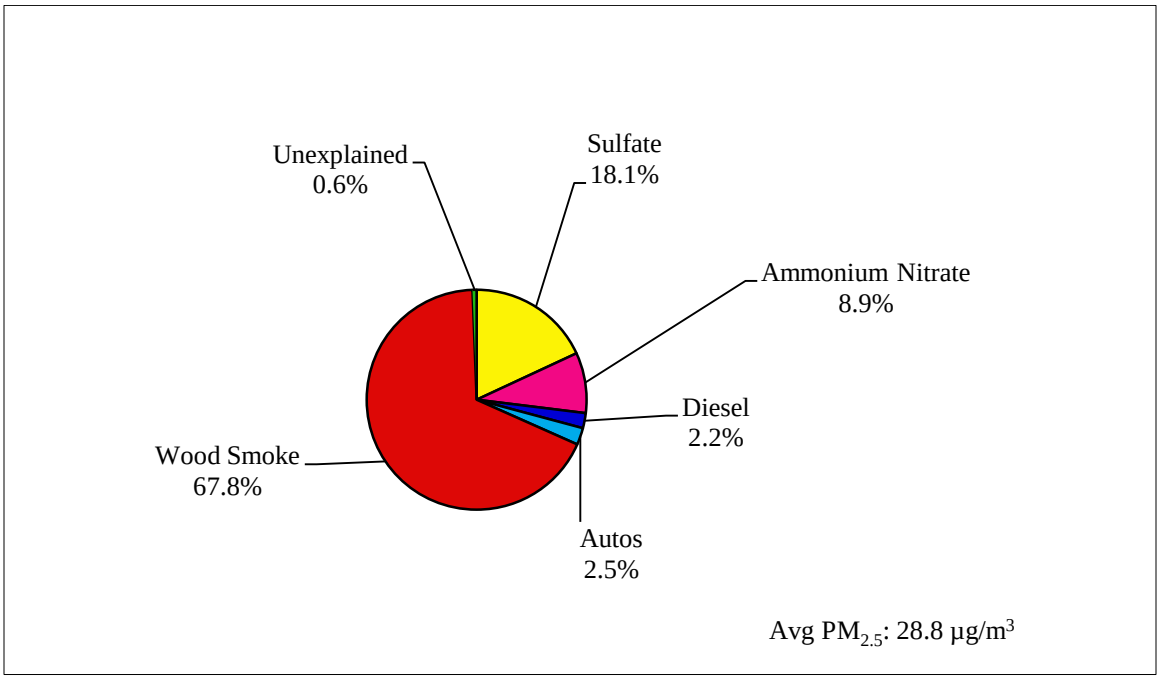

Figure 30: Winter 2009/2010, State Building.
CMB Results with OMNI Source Profiles, November 3, 2009–March 15, 2010.

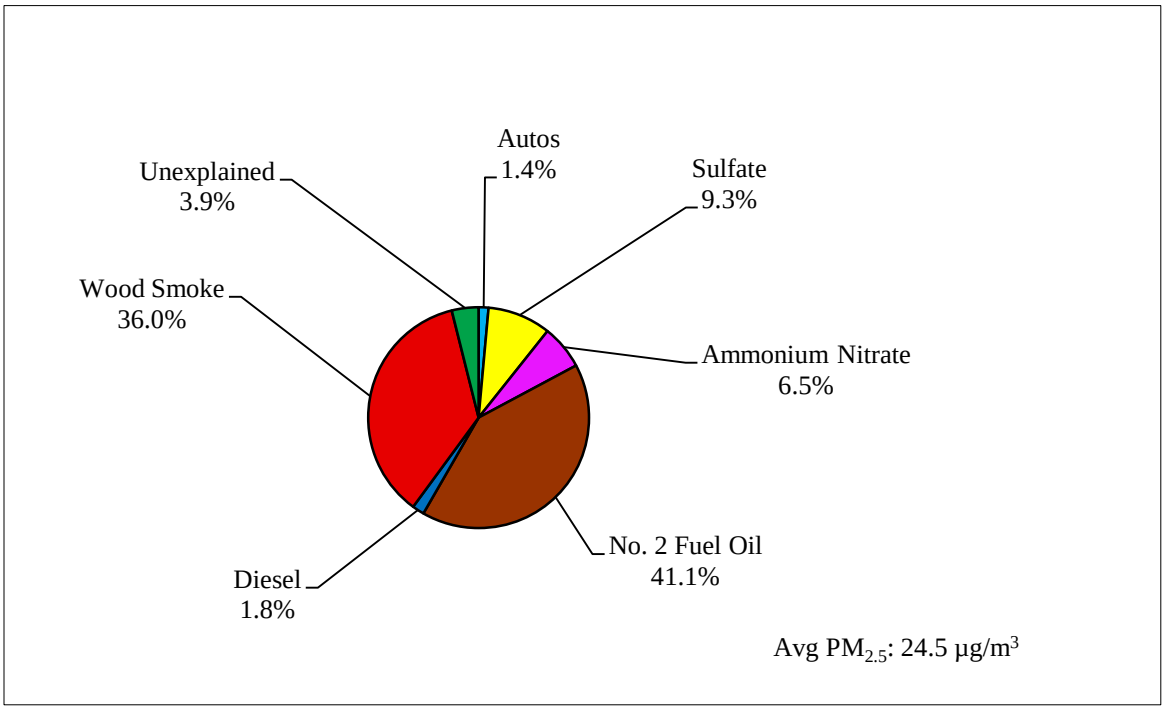

Table 23: Comparison of CMB Results - EPA and OMNI Source Profiles. State Building, Winter 2009/2010.

Season:	**Winter 2009/2010 (EPA)**	**Winter 2009/2010 (OMNI)**
Dates:	11/3/09-3/15/10	11/3/09-3/15/10
n:	40	31
$PM_{2.5}$ Mass (µg/m^3):	28.8	24.5
CMB Source Estimates (µg/m^3 and %)		
Sulfate:	5.2 (18.1 %)	2.2 (9.3 %)
Ammonium Nitrate:	2.5 (8.9 %)	1.6 (6.5 %)
Diesel:	0.6 (2.2 %)	0.4 (1.8 %)
Automobiles:	0.7 (2.5 %)	0.4 (1.4 %)
Wood Smoke:	19.5 (67.8 %)	8.7 (36.0 %)
No. 2 Fuel Oil:	Not Identified	10.0 (41.1 %)
Unexplained:	0.2 (0.6 %)	1.0 (3.9 %)

Figure 31: Winter 2009/2010, North Pole.
CMB Results with EPA Source Profiles, November 3, 2009 – March 15, 2010.

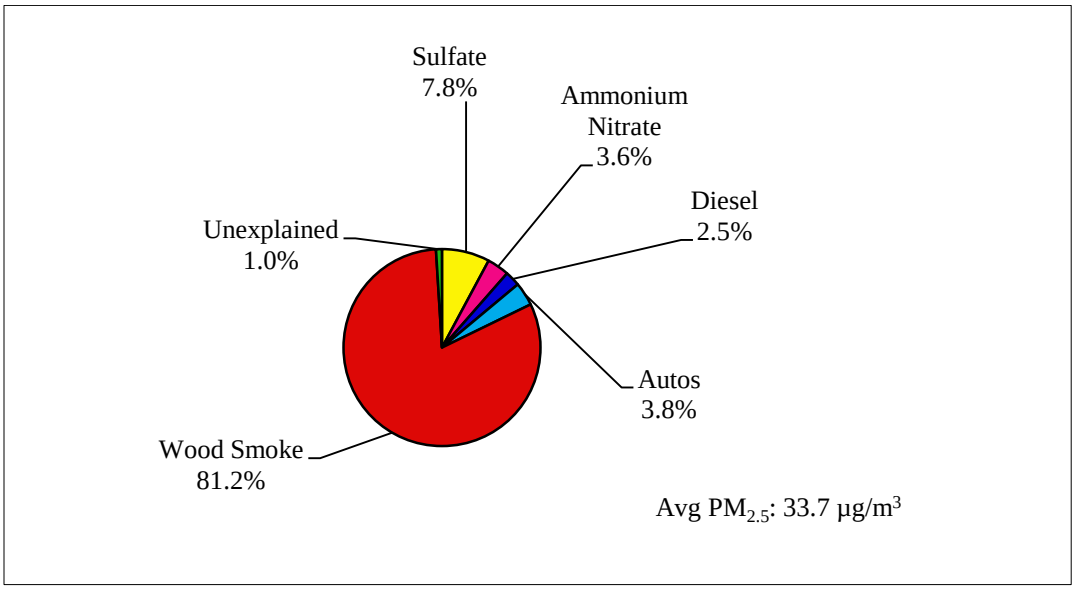

Figure 32: Winter 2009/2010, North Pole.
CMB Results with OMNI Source Profiles, November 3, 2009–March 15, 2010.

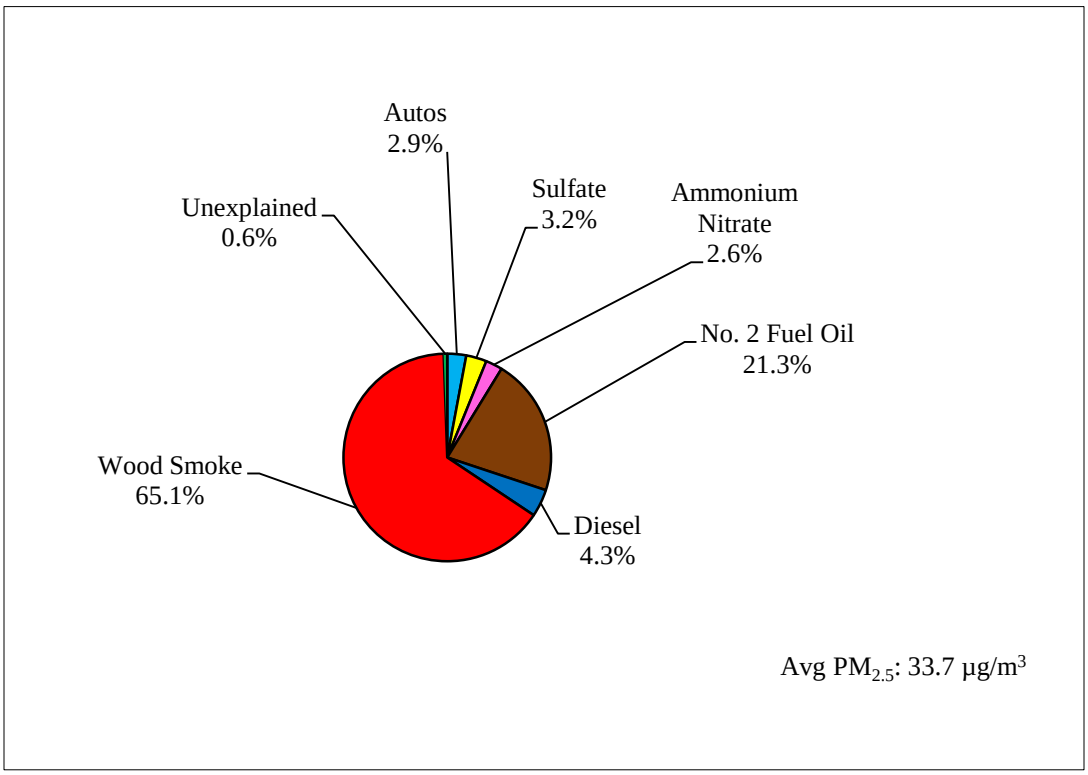

Table 24: Comparison of CMB Results - EPA and OMNI Source Profiles. North Pole, Winter 2009/2010.

Season:	**Winter 2009/2010 (EPA)**	**Winter 2009/2010 (OMNI)**
Dates:	11/3/09-3/15/10	11/3/09-3/15/10
n:	35	35
$PM_{2.5}$ Mass (µg/m^3):	33.7	33.7
CMB Source Estimates (µg/m^3 and %)		
Sulfate:	2.6 (7.8 %)	1.1 (3.2 %)
Ammonium Nitrate:	1.2 (3.6 %)	0.9 (2.6 %)
Diesel:	0.8 (2.5 %)	1.5 (4.3 %)
Automobiles:	1.3 (3.8 %)	1.0 (2.9 %)
Wood Smoke:	27.1 (81.2 %)	22.4 (65.1 %)
No. 2 Fuel Oil:	Not Identified	7.3 (21.3 %)
Unexplained:	0.3 (1.0 %)	0.2 (0.6 %)

Figure 33: Winter 2009/2010, RAMS.
CMB Results with EPA Source Profiles, November 15, 2009 – March 15, 2010.

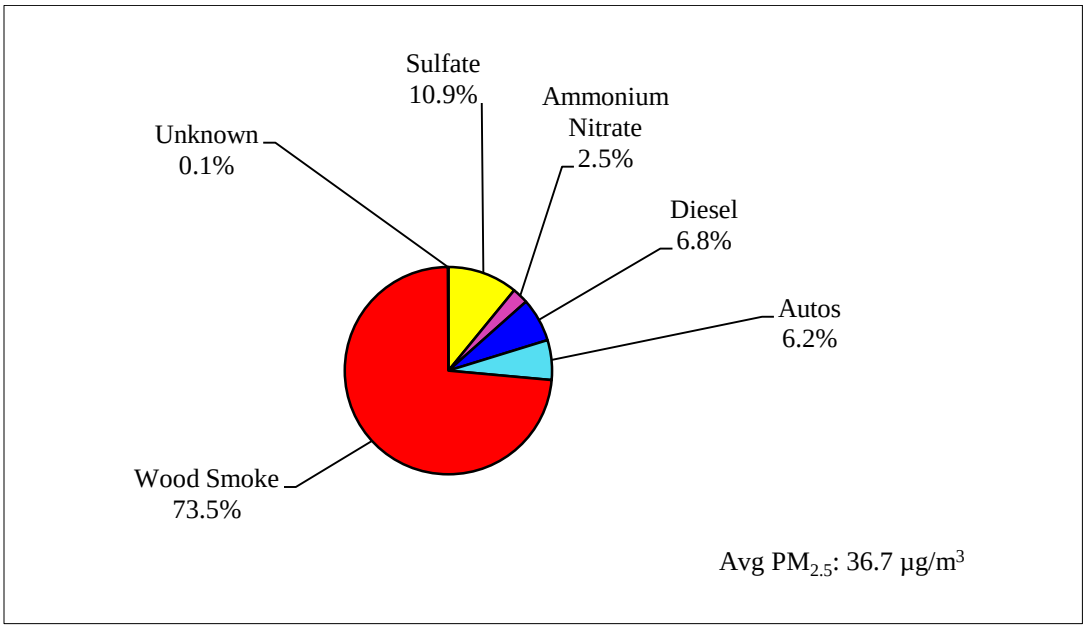

Figure 34: Winter 2009/2010, RAMS.
CMB Results with OMNI Source Profiles, November 15, 2009 – March 15, 2010.

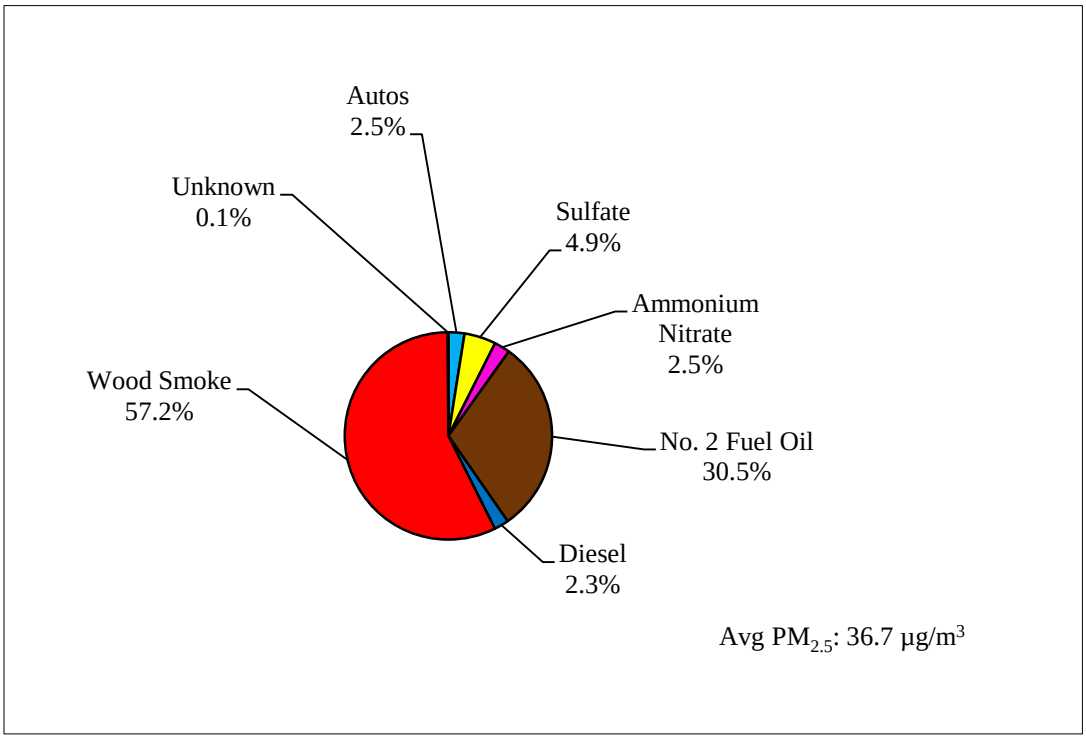

Table 25: Comparison of CMB Results - EPA and OMNI Source Profiles. RAMS, Winter 2009/2010.

Season:	**Winter 2009/2010 (EPA)**	**Winter 2009/2010 (OMNI)**
Dates:	11/15/09-3/15/10	11/15/09-3/15/10
n:	29	29
$PM_{2.5}$ Mass (µg/m^3):	36.7	36.7
CMB Source Estimates (µg/m^3 and %)		
Sulfate:	4.0 (10.9 %)	1.8 (4.9 %)
Ammonium Nitrate:	0.9 (2.5 %)	0.9 (2.5 %)
Diesel:	2.5 (6.8 %)	0.8 (2.3 %)
Automobiles:	2.3 (6.2 %)	0.9 (2.5 %)
Wood Smoke:	26.9 (73.5 %)	21.0 (57.2 %)
No. 2 Fuel Oil:	Not Identified	11.2 (30.5 %)
Unexplained:	0.04 (0.1 %)	0.1 (0.1 %)

Figure 35: Winter 2009/2010, Peger Road.
CMB Results with EPA Source Profiles, November 3, 2009 – March 15, 2010.

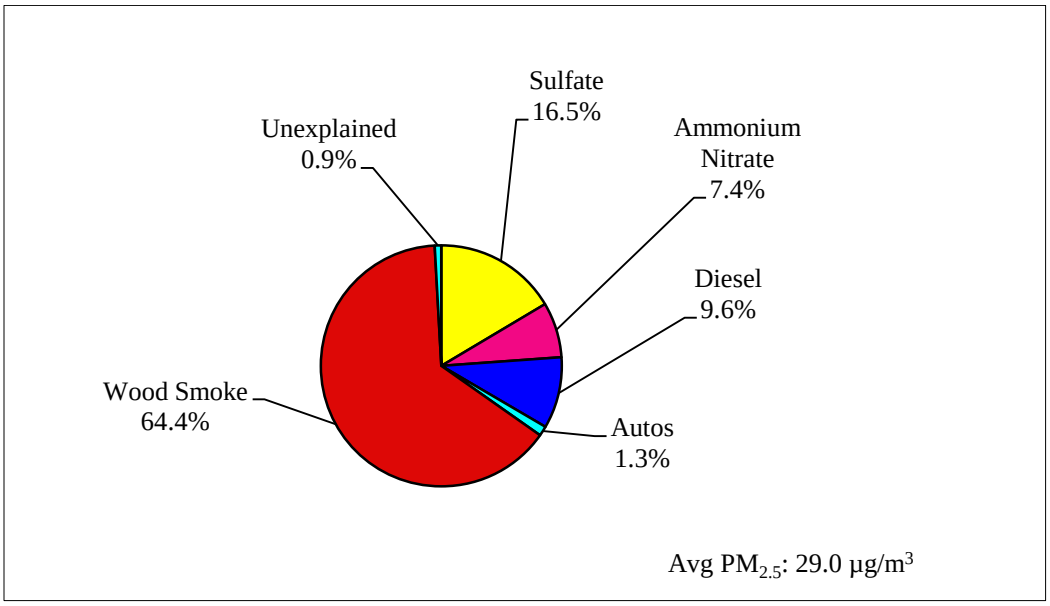

Figure 36: Winter 2009/2010, Peger Road.
CMB Results with OMNI Source Profiles, November 3, 2009 – March 15, 2010.

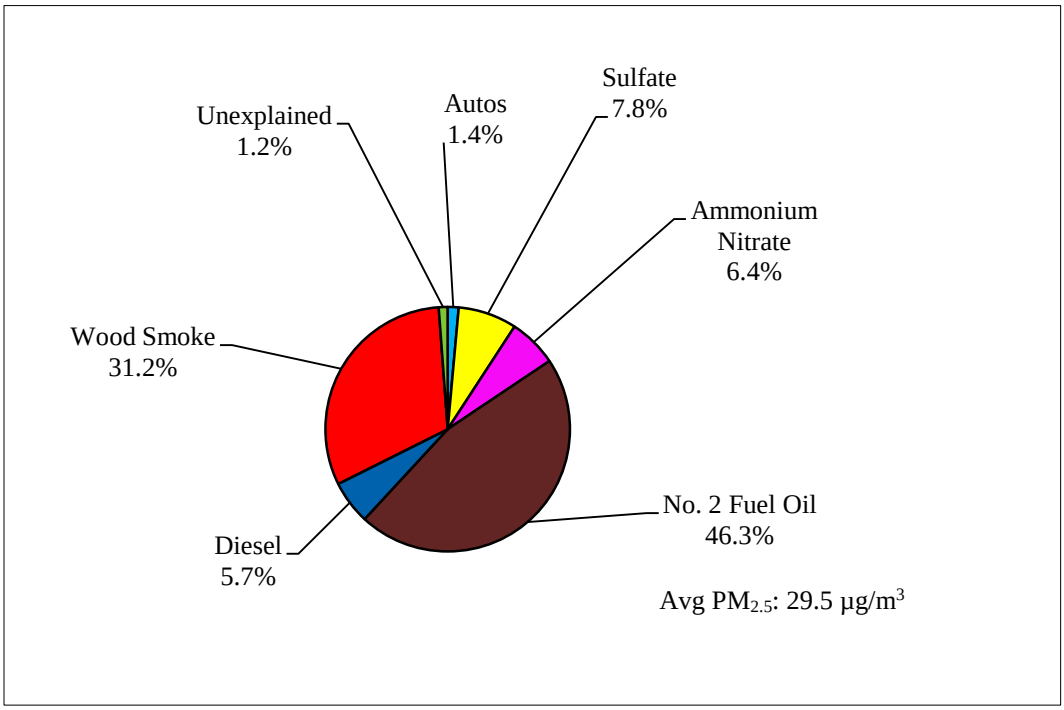

Table 26: Comparison of CMB Results - EPA and OMNI Source Profiles. Peger Road, Winter 2009/2010.

Season:	**Winter 2009/2010 (EPA)**	**Winter 2009/2010 (OMNI)**
Dates:	11/3/09-3/15/10	11/3/09-3/15/10
n:	38	37
$PM_{2.5}$ Mass (µg/m^3):	29.0	29.5
CMB Source Estimates (µg/m^3 and %)		
Sulfate:	4.8 (16.5 %)	2.3 (7.8 %)
Ammonium Nitrate:	2.1 (7.4 %)	1.9 (6.4 %)
Diesel:	2.8 (9.6 %)	1.7 (5.7 %)
Automobiles:	0.4 (1.3 %)	0.4 (1.4 %)
Wood Smoke:	18.6 (64.4 %)	9.2 (31.2 %)
No. 2 Fuel Oil:	Not Identified	13.7 (46.3 %)
Unexplained:	0.3 (0.9 %)	0.3 (1.2 %)

Figure 37: Winter 2010/2011, State Building.
CMB Results with EPA Source Profiles, November 1, 2010 – February 8, 2011.

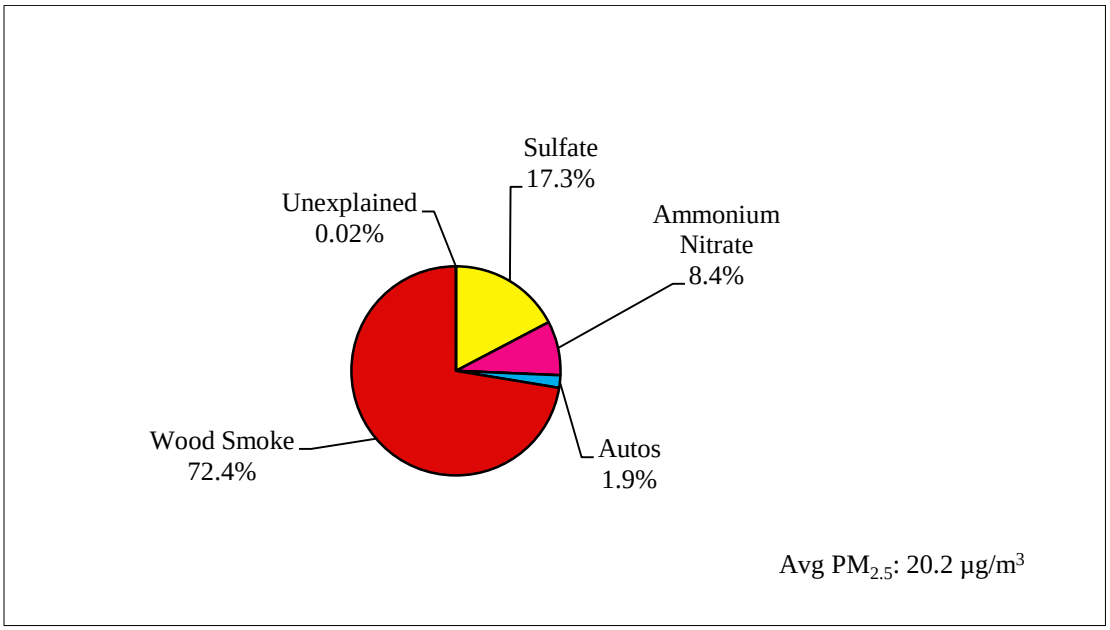

Figure 38: Winter 2010/2011, State Building.
CMB Results with OMNI Source Profiles, November 1, 2010 – February 8, 2011.

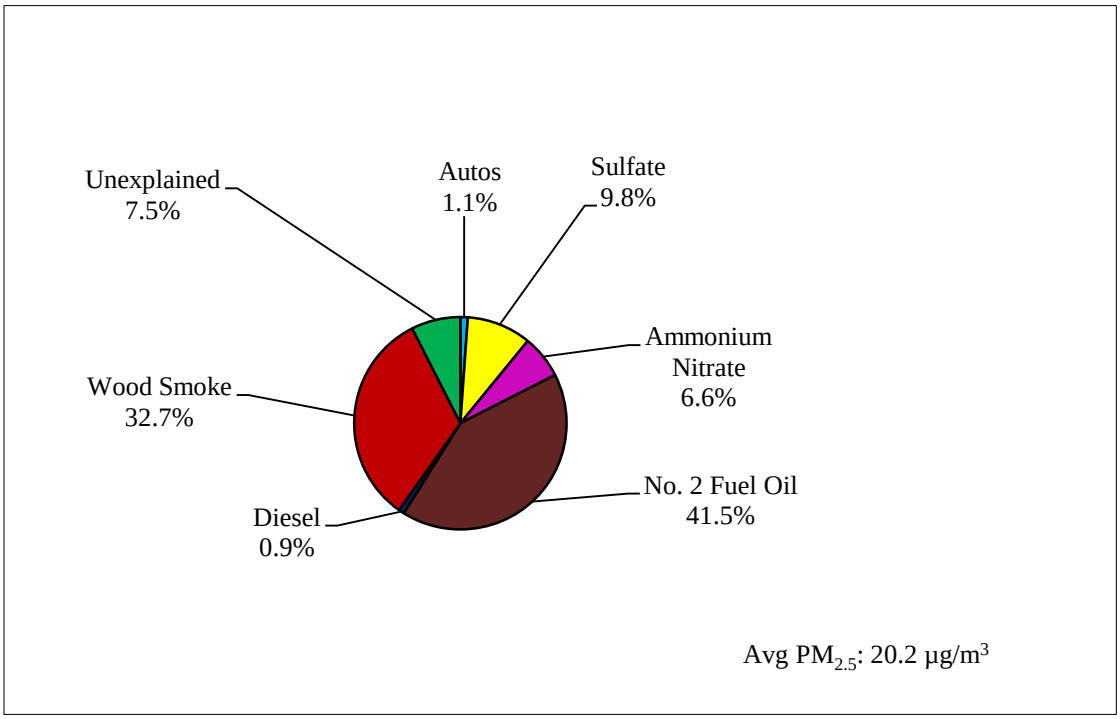

Table 27: Comparison of CMB Results - EPA and OMNI Source Profiles. State Building, Winter 2010/2011.

Season:	**Winter 2010/2011 (EPA)**	**Winter 2010/2011 (OMNI)**
Dates:	11/1/10-2/8/11	11/1/10-2/8/11
n:	15	15
$PM_{2.5}$ Mass (µg/m^3)	20.2	20.2
CMB Source Estimates (µg/m^3 and %)		
Sulfate:	3.5 (17.3 %)	2.0 (9.8 %)
Ammonium Nitrate:	1.7 (8.4 %)	1.3 (6.6 %)
Diesel:	Not Identified	0.2 (0.9 %)
Automobiles:	0.4 (1.9 %)	0.2 (1.1 %)
Wood Smoke:	14.6 (72.4 %)	6.5 (32.7 %)
No. 2 Fuel Oil:	Not Identified	8.3 (41.5 %)
Unexplained:	0.004 (0.02 %)	1.5 (7.5 %)

Figure 39: Winter 2010/2011, North Pole.
CMB Results with EPA Source Profiles, January 9, 2011 – February 5, 2011.

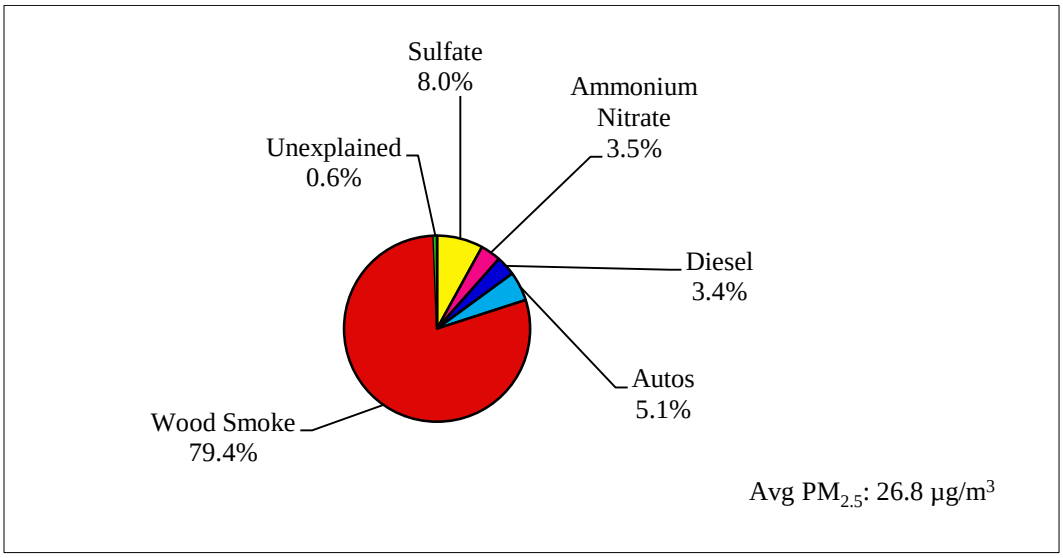

Figure 40: Winter 2010/2011, North Pole.
CMB Results with OMNI Source Profiles, January 9, 2011 – February 5, 2011.

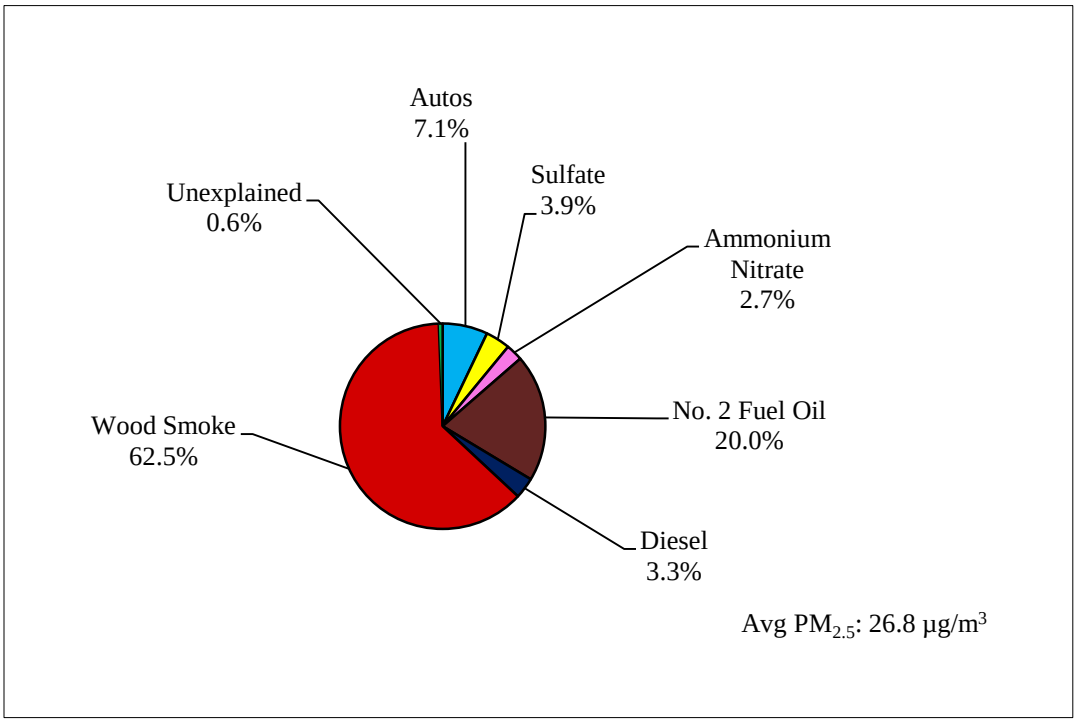

Table 28: Comparison of CMB Results - EPA and OMNI Source Profiles. North Pole, Winter 2010/2011.

Season:	**Winter 2010/2011 (EPA)**	**Winter 2010/2011 (OMNI)**
Dates:	1/9/11-2/5/11	1/9/11-2/5/11
n:	10	10
$PM_{2.5}$ Mass (µg/m^3):	26.8	26.8
CMB Source Estimates (µg/m^3 and %)		
Sulfate:	2.1 (8.0 %)	1.0 (3.9 %)
Ammonium Nitrate:	0.9 (3.5 %)	0.7 (2.7 %)
Diesel:	0.9 (3.4 %)	0.9 (3.3 %)
Automobiles:	1.4 (5.1 %)	1.9 (7.1 %)
Wood Smoke:	21.3 (79.4 %)	16.6 (62.5 %)
No. 2 Fuel Oil:	Not Identified	5.3 (20.0 %)
Unexplained:	0.2 (0.6 %)	0.2 (0.6 %)

Figure 41: Winter 2010/2011, Peger Road.
CMB Results with EPA Source Profiles, January 9, 2011 – February 5, 2011.

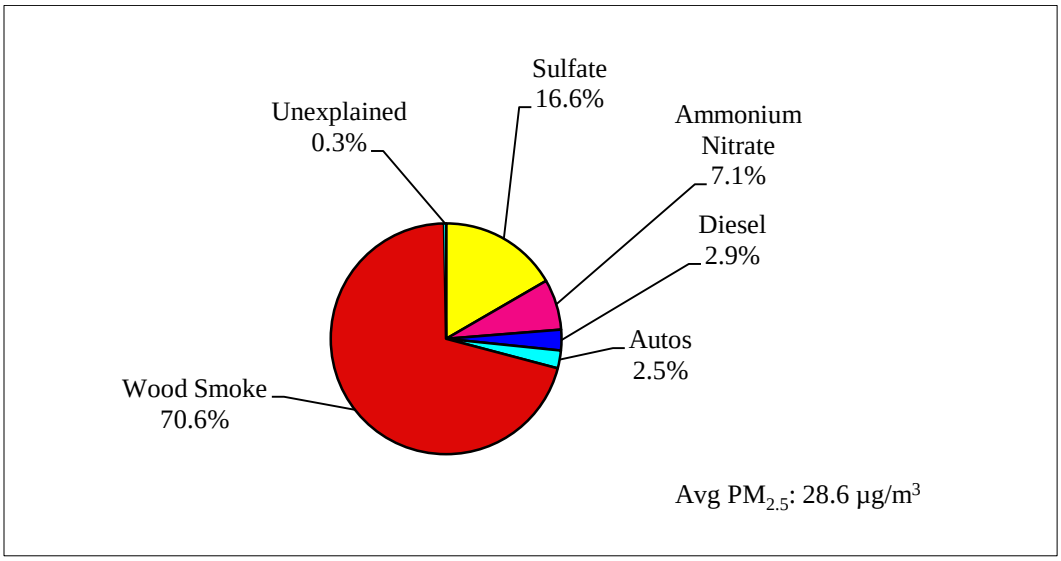

Figure 42: Winter 2010/2011, Peger Road.
CMB Results with OMNI Source Profiles, January 9, 2011 – February 5, 2011.

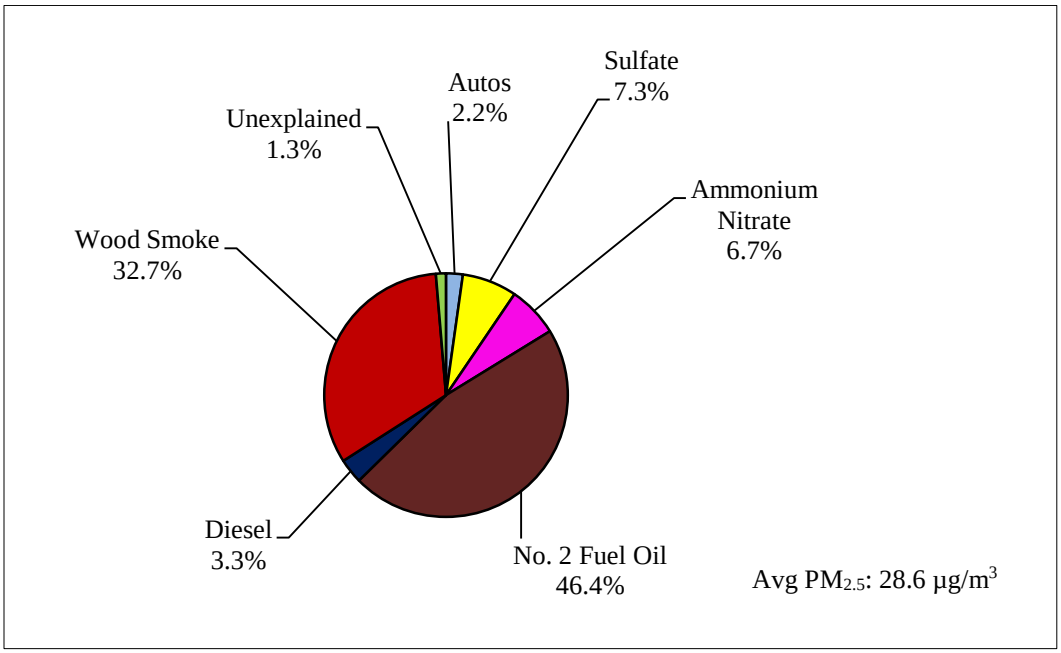

Table 29: Comparison of CMB Results - EPA and OMNI Source Profiles. Peger Road, Winter 2010/2011.

Season:	**Winter 2010/2011 (EPA)**	**Winter 2010/2011 (OMNI)**
Dates:	1/9/11-2/5/11	1/9/11-2/5/11
n:	10	10
$PM_{2.5}$ Mass (µg/m^3):	28.6	28.6
CMB Source Estimates (µg/m^3 and %)		
Sulfate:	4.8 (16.6 %)	2.1 (7.3 %)
Ammonium Nitrate:	2.0 (7.1 %)	2.0 (6.7 %)
Diesel:	0.8 (2.9 %)	1.0 (3.3 %)
Automobiles:	0.7 (2.5 %)	0.6 (2.2 %)
Wood Smoke:	20.2 (70.6 %)	9.5 (32.7 %)
No. 2 Fuel Oil:	Not Identified	13.5 (46.4 %)
Unexplained:	0.1 (0.3 %)	0.4 (1.3 %)

Figure 43: Winter 2011/2012, State Building.
CMB Results with EPA Source Profiles, November 2, 2011 – March 31, 2012.

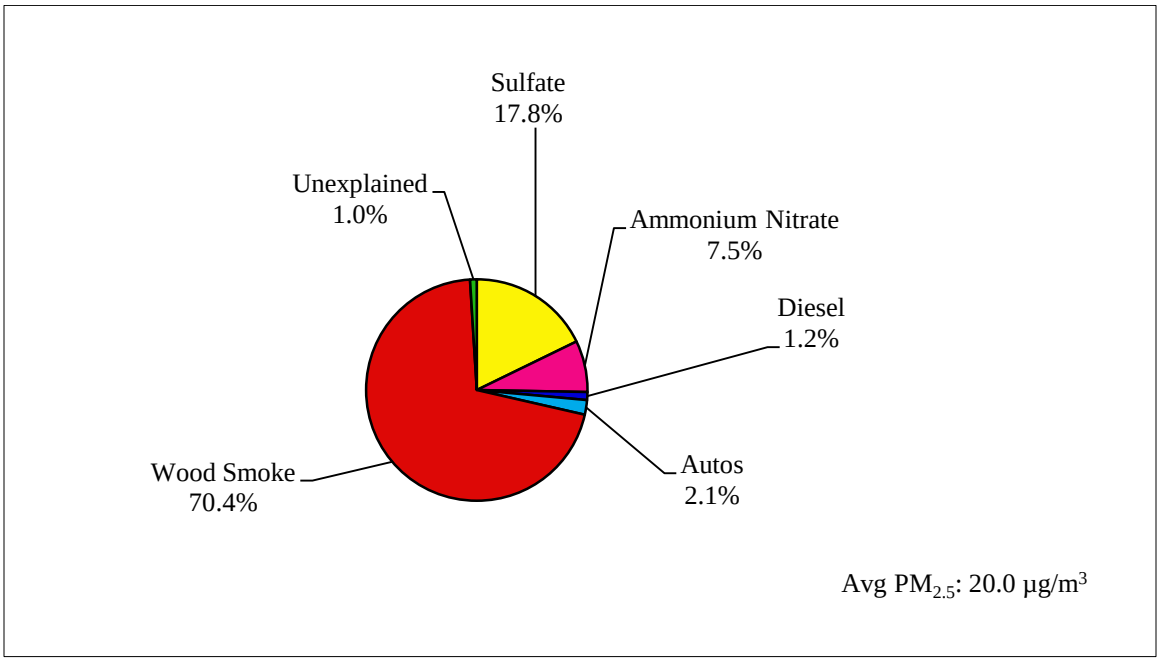

Figure 44: Winter 2011/2012, State Building.
CMB Results with OMNI Source Profiles, November 2, 2011 – March 31, 2012.

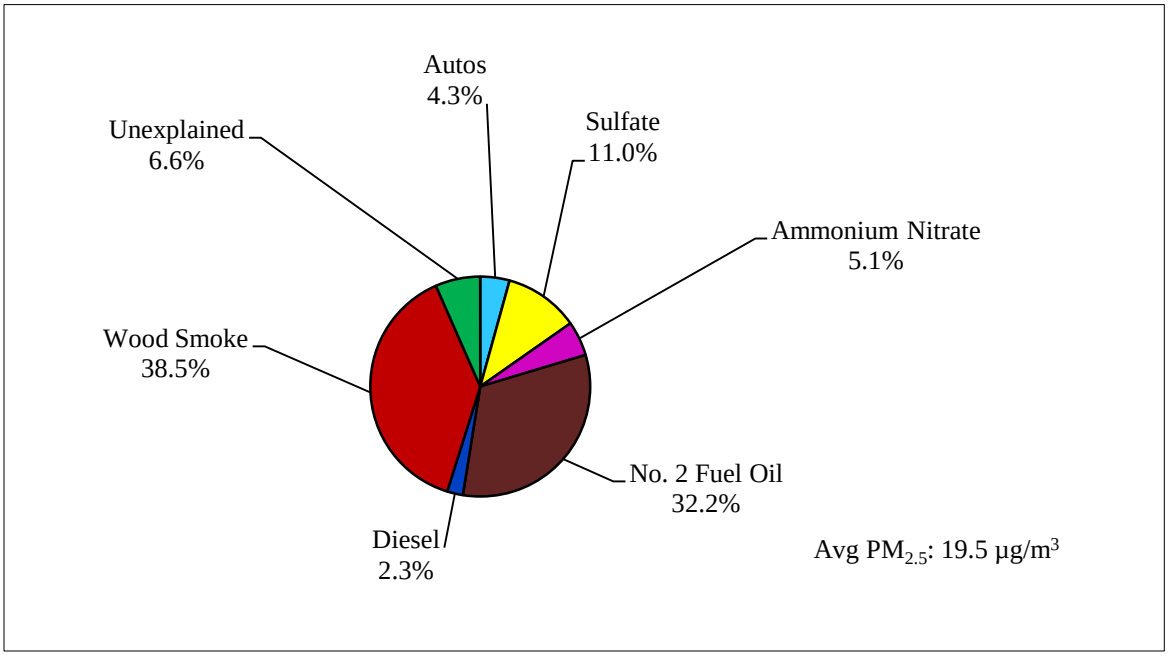

Table 30: Comparison of CMB Results - EPA and OMNI Source Profiles. State Building, Winter 2011/2012.

Season:	**Winter 2011/2012 (EPA)**	**Winter 2011/2012 (OMNI)**
Dates:	11/2/11-3/31/12	11/2/11-3/31/12
n:	38	36
$PM_{2.5}$ Mass ($\mu g/m^3$):	20.0	19.5
CMB Source Estimates ($\mu g/m^3$ and %)		
Sulfate:	3.5 (17.8 %)	2.2 (11.0 %)
Ammonium Nitrate:	1.5 (7.5 %)	1.0 (5.1 %)
Diesel:	0.2 (1.2 %)	0.5 (2.3 %)
Automobiles:	0.4 (2.1 %)	0.8 (4.3 %)
Wood Smoke:	14.0 (70.4 %)	7.6 (38.5 %)
No. 2 Fuel Oil:	Not Identified	6.4 (32.2 %)
Unexplained:	0.2 (1.0 %)	1.3 (6.6 %)

Figure 45: Winter 2011/2012, North Pole.
CMB Results with EPA Source Profiles, November 2, 2011 – March 25, 2012.

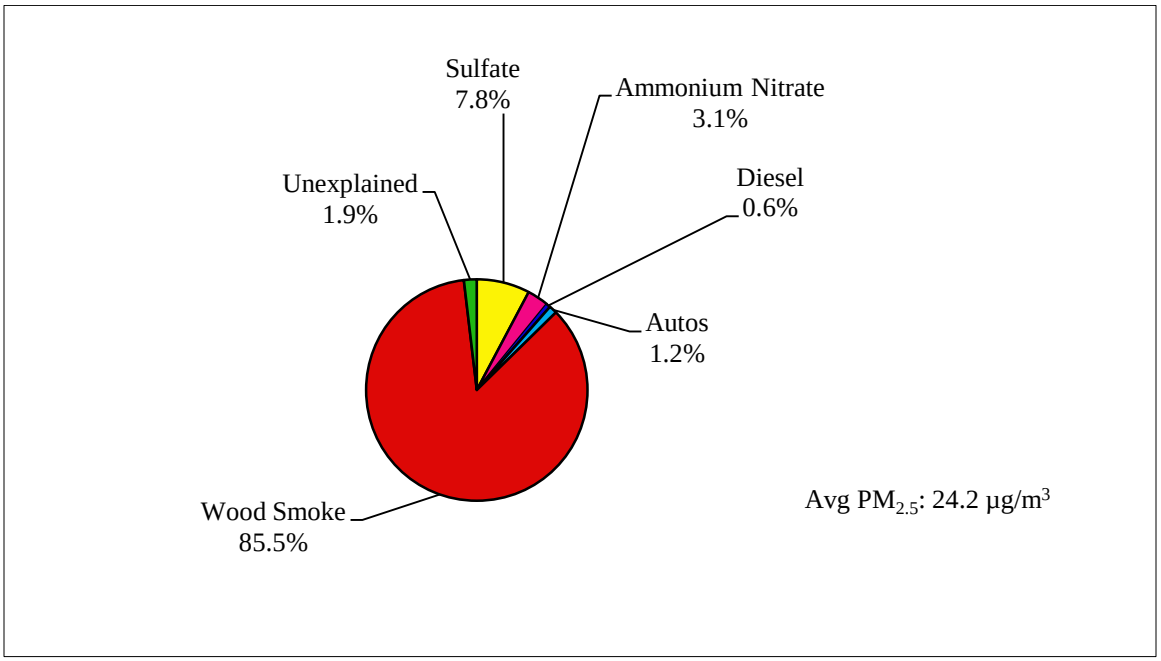

Figure 46: Winter 2011/2012, North Pole.
CMB Results with OMNI Source Profiles, November 2, 2011 – March 25, 2012.

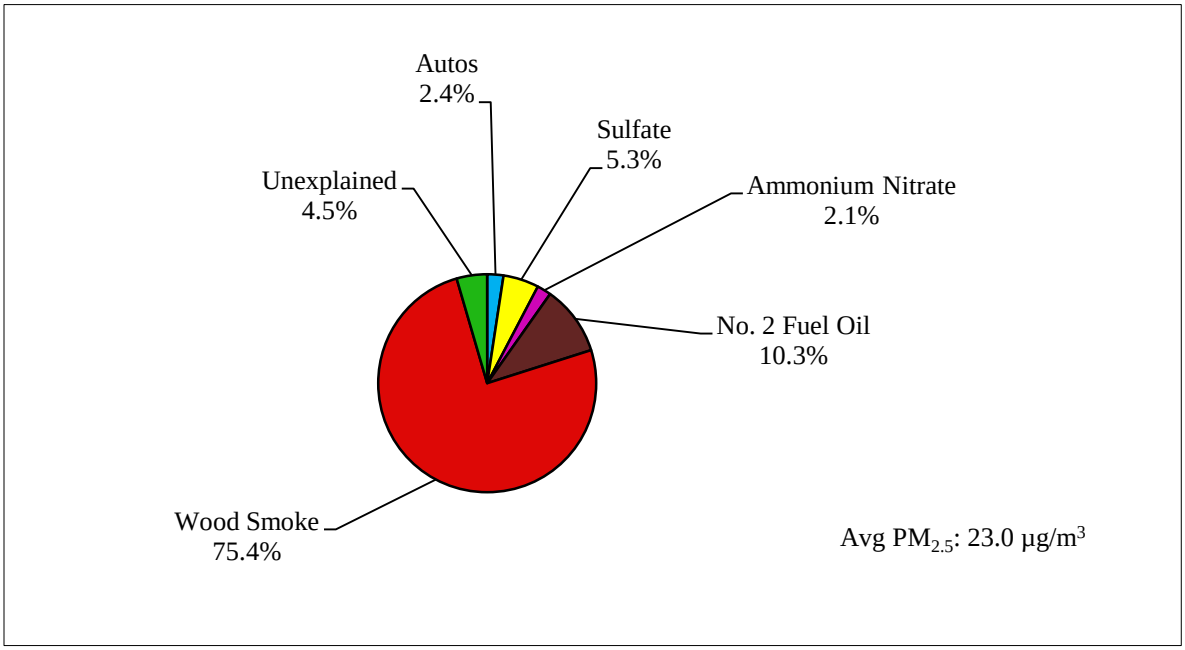

Table 31: Comparison of CMB Results - EPA and OMNI Source Profiles. North Pole, Winter 2011/2012.

Season:	**Winter 2011/2012 (EPA)**	**Winter 2011/2012 (OMNI)**
Dates:	11/2/11-3/25/12	11/2/11-3/25/12
n:	36	35
$PM_{2.5}$ Mass (µg/m^3):	24.2	23.0
CMB Source Estimates (µg/m^3 and %)		
Sulfate:	1.8 (7.8 %)	1.2 (5.3 %)
Ammonium Nitrate:	0.7 (3.1 %)	0.5 (2.1 %)
Diesel:	0.1 (0.6 %)	Not Identified
Automobiles:	0.3 (1.2 %)	0.6 (2.4 %)
Wood Smoke:	20.4 (85.5 %)	17.3 (75.4 %)
No. 2 Fuel Oil:	Not Identified	2.4 (10.3 %)
Unexplained:	0.4 (1.9 %)	1.0 (4.5 %)

Figure 47: Winter 2011/2012, RAMS.
CMB Results with EPA Source Profiles, December 20, 2011 – February 27, 2012.

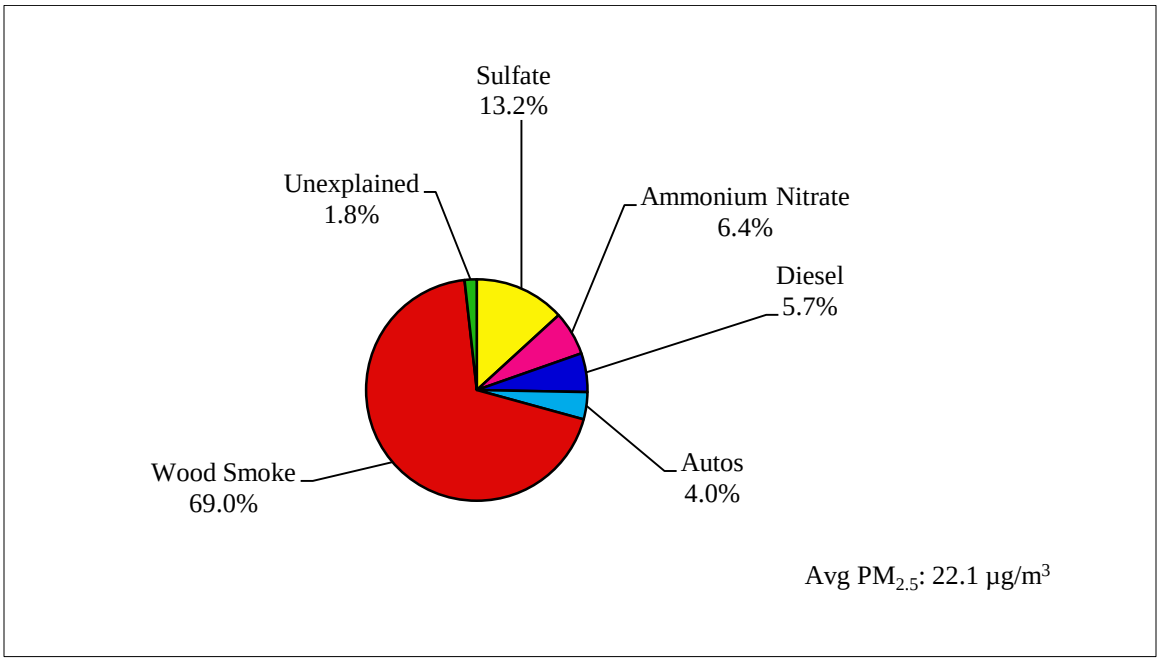

Figure 48: Winter 2011/2012, RAMS.
CMB Results with OMNI Source Profiles, December 20, 2011 – February 27, 2012.

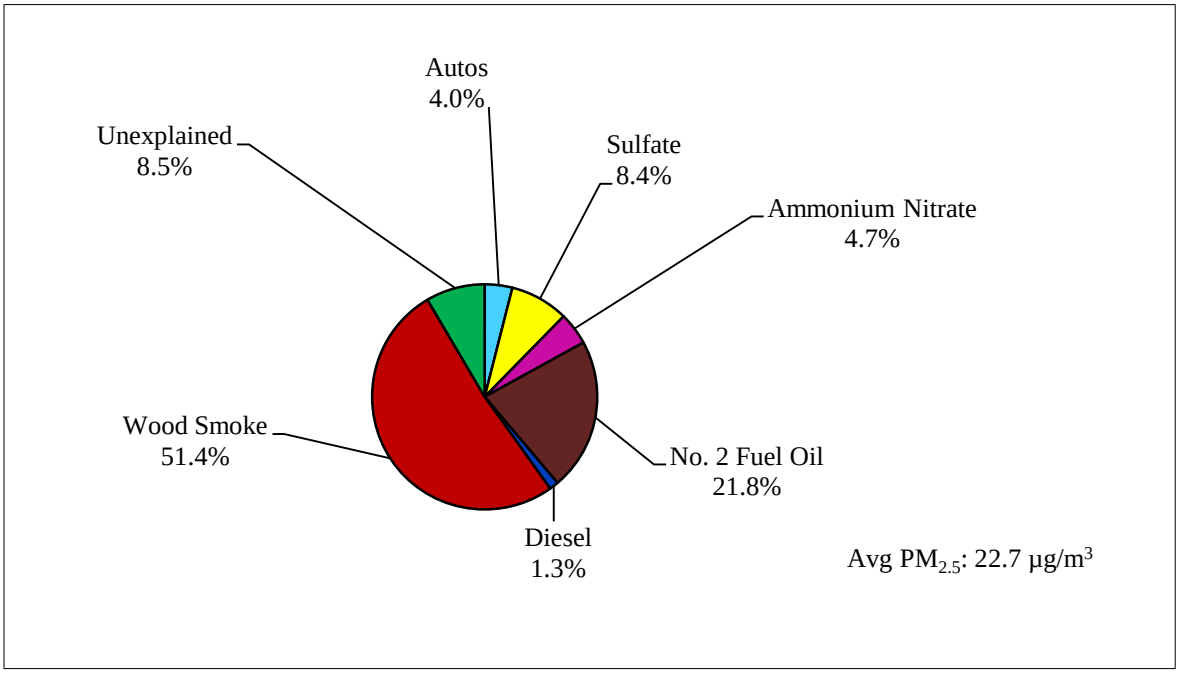

Table 32: Comparison of CMB Results - EPA and OMNI Source Profiles. RAMS, Winter 2011/2012.

Season:	**Winter 2011/2012 (EPA)**	**Winter 2011/2012 (OMNI)**
Dates:	12/20/11-2/27/12	12/20/11-2/27/12
n:	16	15
$PM_{2.5}$ Mass (µg/m^3):	22.1	22.7
CMB Source Estimates (µg/m^3 and %)		
Sulfate:	2.9 (13.2 %)	1.9 (8.4 %)
Ammonium Nitrate:	1.4 (6.4 %)	1.0 (4.7 %)
Diesel:	1.2 (5.7 %)	0.3 (1.3 %)
Automobiles:	0.9 (4.0 %)	0.9 (4.0 %)
Wood Smoke:	14.9 (69.0 %)	11.5 (51.4 %)
No. 2 Fuel Oil:	Not Identified	4.9 (21.8 %)
Unexplained:	0.4 (1.8 %)	1.9 (8.5 %)

Figure 49: Winter 2011/2012, NCORE.
CMB Results with EPA Source Profiles, November 2, 2011 – March 31, 2012.

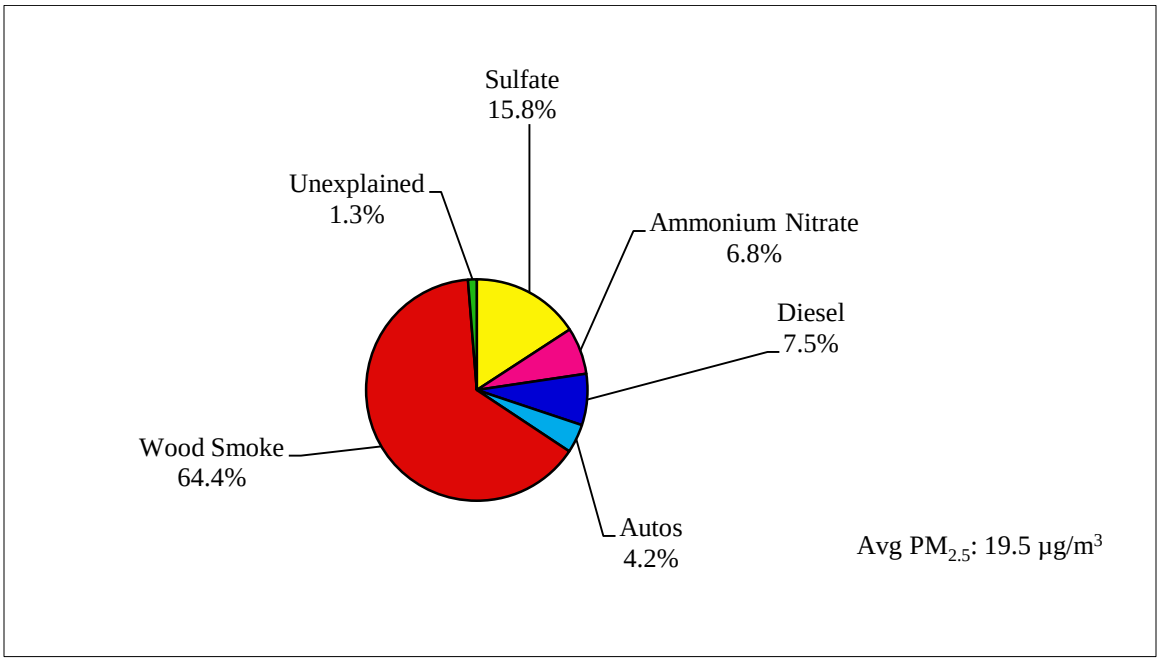

Figure 50: Winter 2011/2012, NCORE.
CMB Results with OMNI Source Profiles, November 2, 2011 – March 31, 2012.

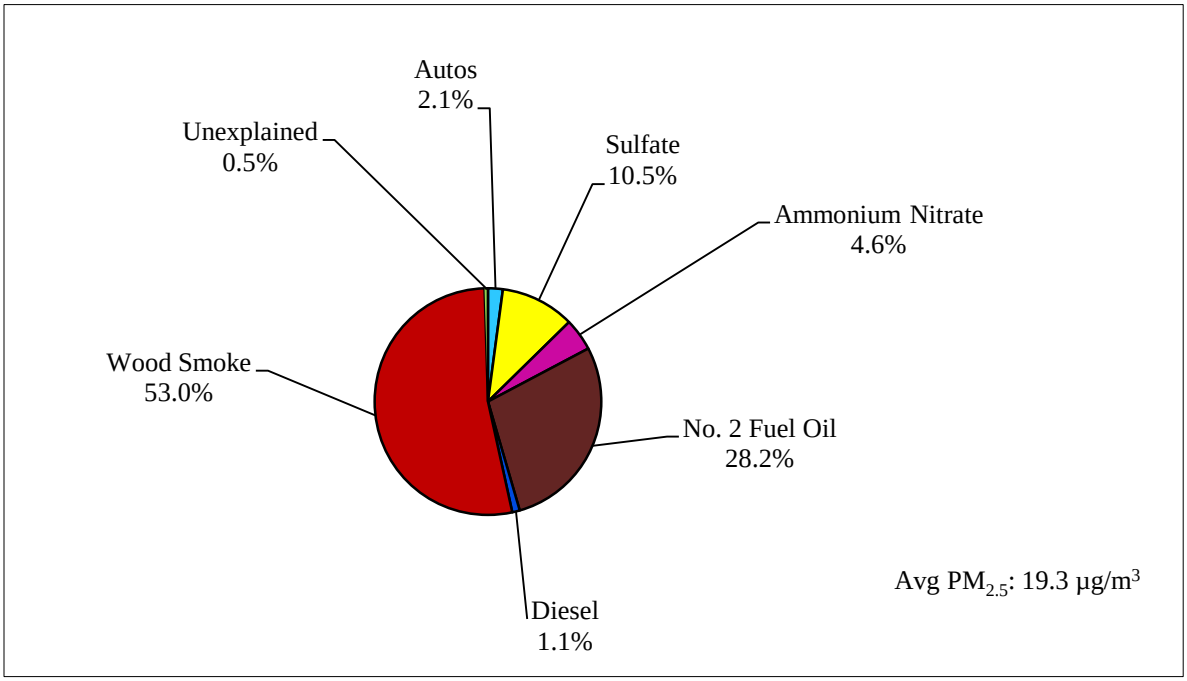

Table 33: Comparison of CMB Results - EPA and OMNI Source Profiles. NCORE, Winter 2011/2012.

Season:	**Winter 2011/2012 (EPA)**	**Winter 2011/2012 (OMNI)**
Dates:	11/2/11-3/31/12	11/2/11-3/31/12
n:	44	42
$PM_{2.5}$ Mass (µg/m^3):	19.5	19.3
CMB Source Estimates (µg/m^3 and %)		
Sulfate:	3.0 (15.8 %)	2.0 (10.5 %)
Ammonium Nitrate:	1.3 (6.8 %)	0.9 (4.6 %)
Diesel:	1.4 (7.5 %)	0.2 (1.1 %)
Automobiles:	0.8 (4.2 %)	0.4 (2.1 %)
Wood Smoke:	12.4 (64.4 %)	10.1 (53.0 %)
No. 2 Fuel Oil:	Not Identified	5.4 (28.2 %)
Unexplained:	0.2 (1.3 %)	0.1 (0.5 %)

Figure 51: Winter 2011/2012, NPF3.
CMB Results with EPA Source Profiles, March 1, 2011 – March 31, 2012.

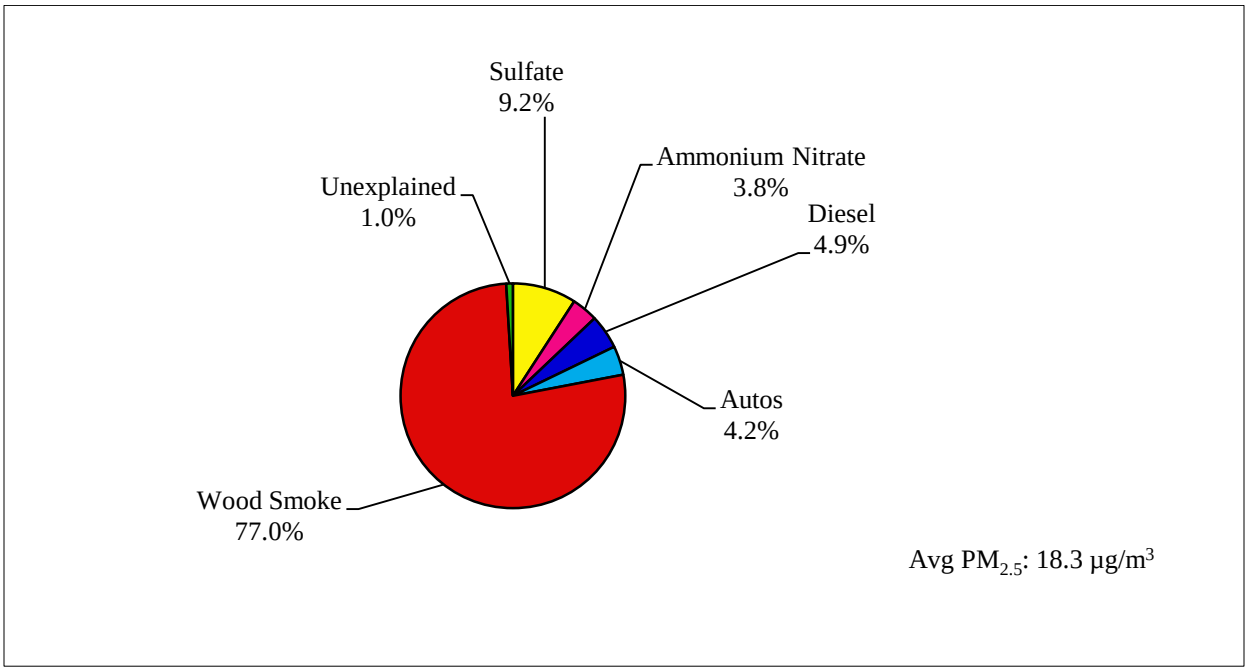

Figure 52: Winter 2011/2012, NPF3.
CMB Results with OMNI Source Profiles, March 1, 2011 – March 31, 2012.

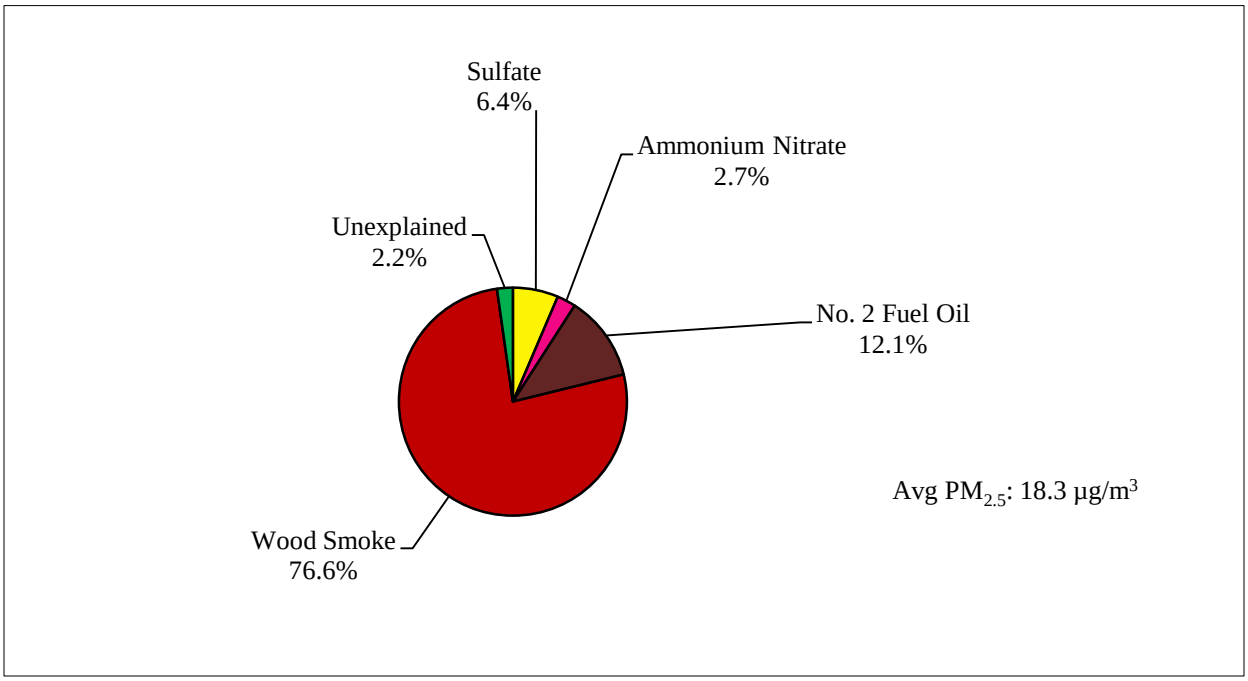

Table 34: Comparison of CMB Results - EPA and OMNI Source Profiles. NPF3, Winter 2011/2012.

Season:	**Winter 2011/2012 (EPA)**	**Winter 2011/2012 (OMNI)**
Dates:	3/1/12-3/31/12	3/1/12-3/31/12
n:	7	7
$PM_{2.5}$ Mass (µg/m^3):	18.3	18.3
CMB Source Estimates (µg/m^3 and %)		
Sulfate:	1.7 (9.2 %)	1.2 (6.4 %)
Ammonium Nitrate:	0.7 (3.8 %)	0.5 (2.7 %)
Diesel:	0.9 (4.9 %)	Not Identified
Automobiles:	0.8 (4.2 %)	Not Identified
Wood Smoke:	14.2 (77.0 %)	14.1 (76.6 %)
No. 2 Fuel Oil:	Not Identified	2.2 (12.1 %)
Unexplained:	0.2 (1.0 %)	0.4 (2.2 %)

Figure 53: Summer 2012, State Building.
CMB Results with EPA Source Profiles, June 2, 2012 – August 31, 2012.

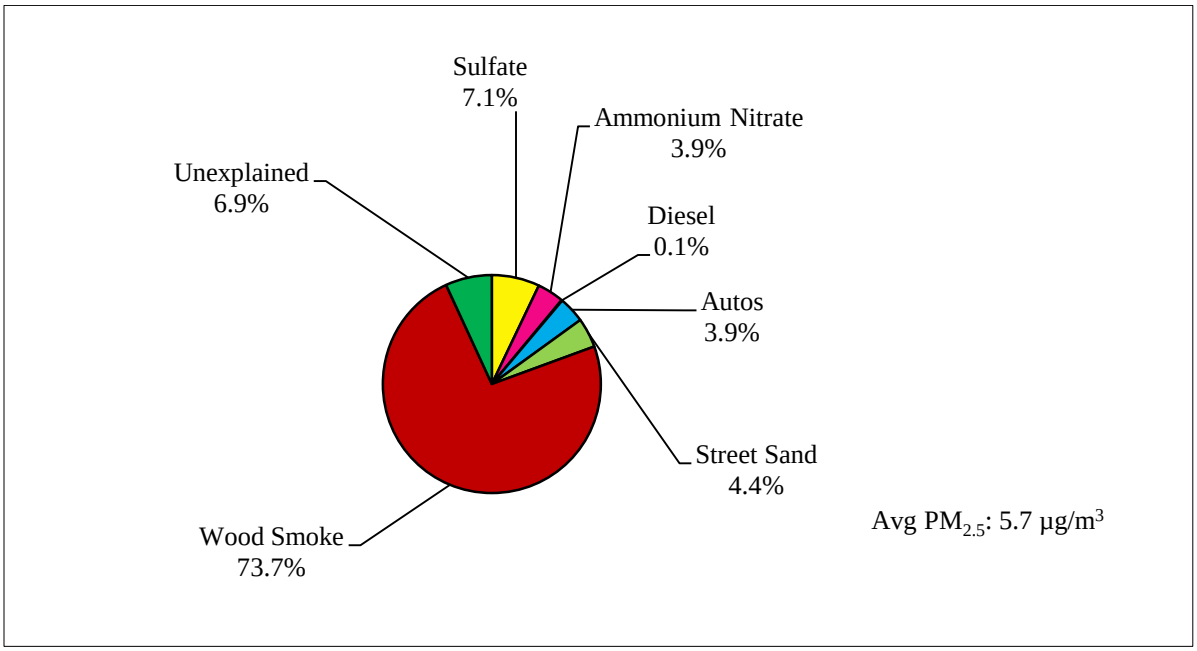

Figure 54: Summer 2012, State Building.
CMB Results with OMNI Source Profiles, June 2, 2012 – August 31, 2012.

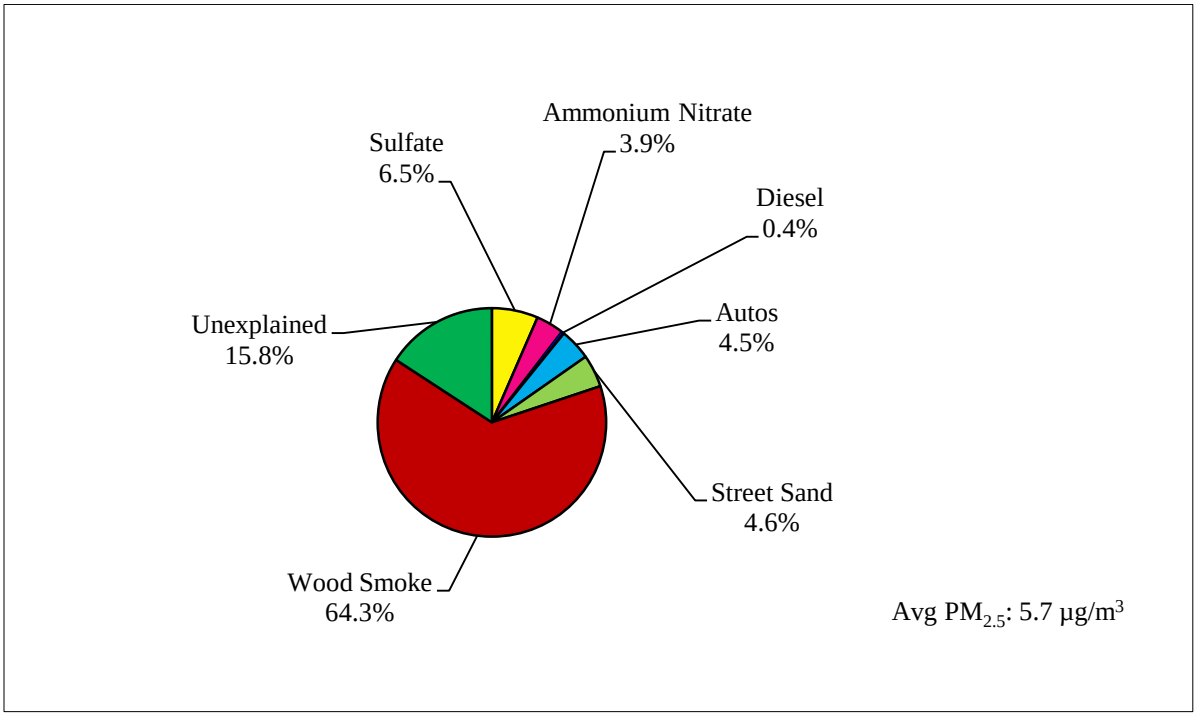

Table 35: Comparison of CMB Results - EPA and OMNI Source Profiles. State Building, Summer 2012.

Season:	**Summer 2012 (EPA)**	**Summer 2012 (OMNI)**
Dates:	6/2/12-8/31/12	6/2/12-8/31/12
n:	20	20
$PM_{2.5}$ Mass (µg/m^3):	5.7	5.7
CMB Source Estimates (µg/m^3 and %)		
Sulfate:	0.4 (7.1 %)	0.4 (6.5 %)
Ammonium Nitrate:	0.2 (3.9 %)	0.2 (3.9 %)
Diesel:	0.01 (0.1 %)	0.02 (0.4 %)
Automobiles:	0.2 (3.9 %)	0.3 (4.5 %)
Wood Smoke:	4.2 (73.7 %)	3.6 (64.3 %)
No. 2 Fuel Oil:	Not Identified	Not Identified
Street Sand:	0.3 (4.4 %)	0.3 (4.6 %)
Unexplained:	0.3 (6.9 %)	0.9 (15.8 %)

Figure 55: Summer 2012, NCORE.
CMB Results with EPA Source Profiles, June 14, 2012 – August 31, 2012.

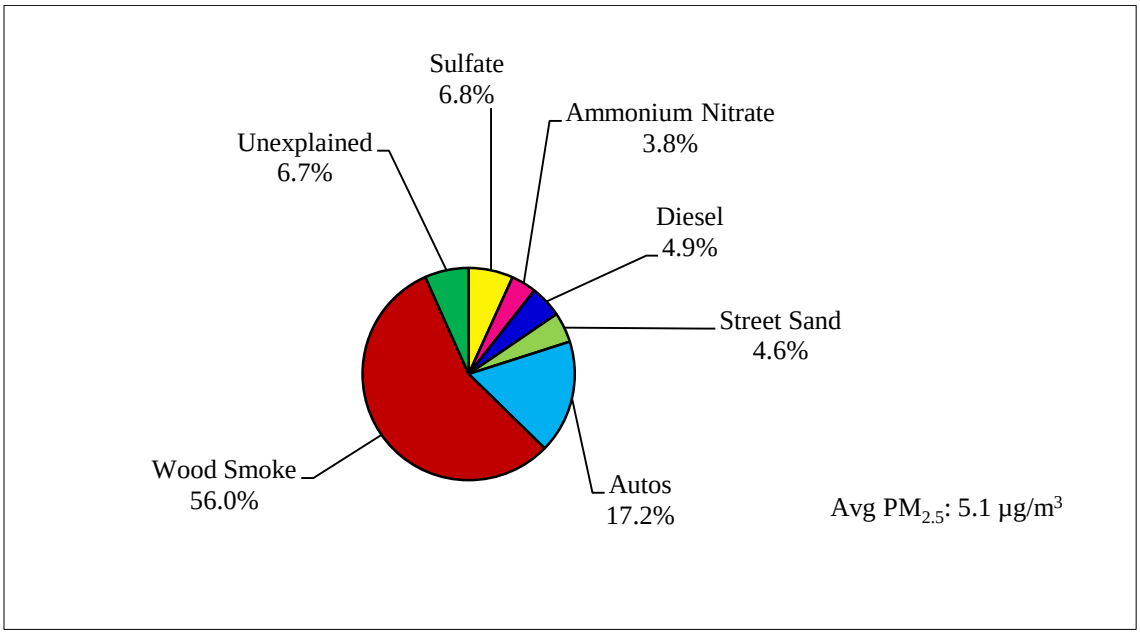

Figure 56: Summer 2012, NCORE.
CMB Results with OMNI Source Profiles, June 14, 2012 – August 31, 2012.

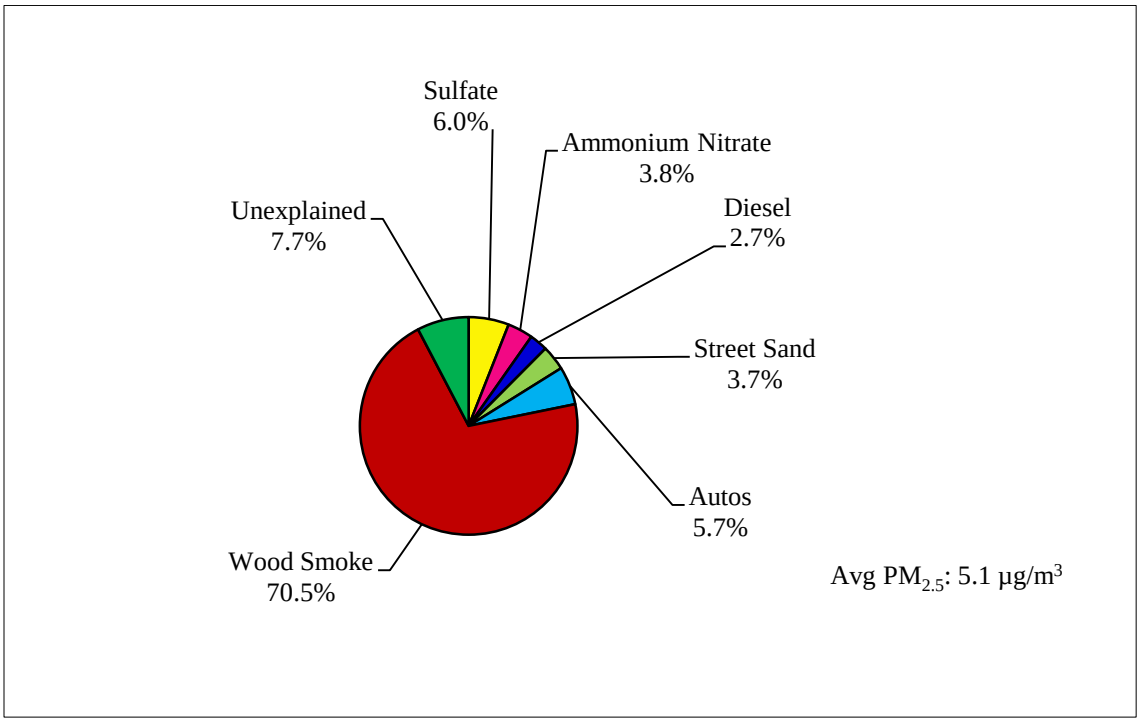

Table 36: Comparison of CMB Results - EPA and OMNI Source Profiles. NCORE, Summer 2012.

Season:	**Summer 2012 (EPA)**	**Summer 2012 (OMNI)**
Dates:	6/14/12-8/31/12	6/14/12-8/31/12
n:	17	17
$PM_{2.5}$ Mass (µg/m^3):	5.1	5.1
CMB Source Estimates (µg/m^3 and %)		
Sulfate:	0.4 (6.8 %)	0.4 (6.0 %)
Ammonium Nitrate:	0.2 (3.8 %)	0.2 (3.8 %)
Diesel:	0.3 (4.9 %)	0.2 (2.7 %)
Automobiles:	1.0 (17.2 %)	0.3 (5.7 %)
Wood Smoke:	3.3 (56.0 %)	4.2 (70.5 %)
No. 2 Fuel Oil:	Not Identified	Not Identified
Street Sand:	0.3 (4.6 %)	0.2 (3.7 %)
Unexplained:	0.4 (6.7 %)	0.5 (7.7 %)

Figure 57: Winter 2012/2013, State Building.
CMB Results with EPA Source Profiles, November 2, 2012 – March 29, 2013.

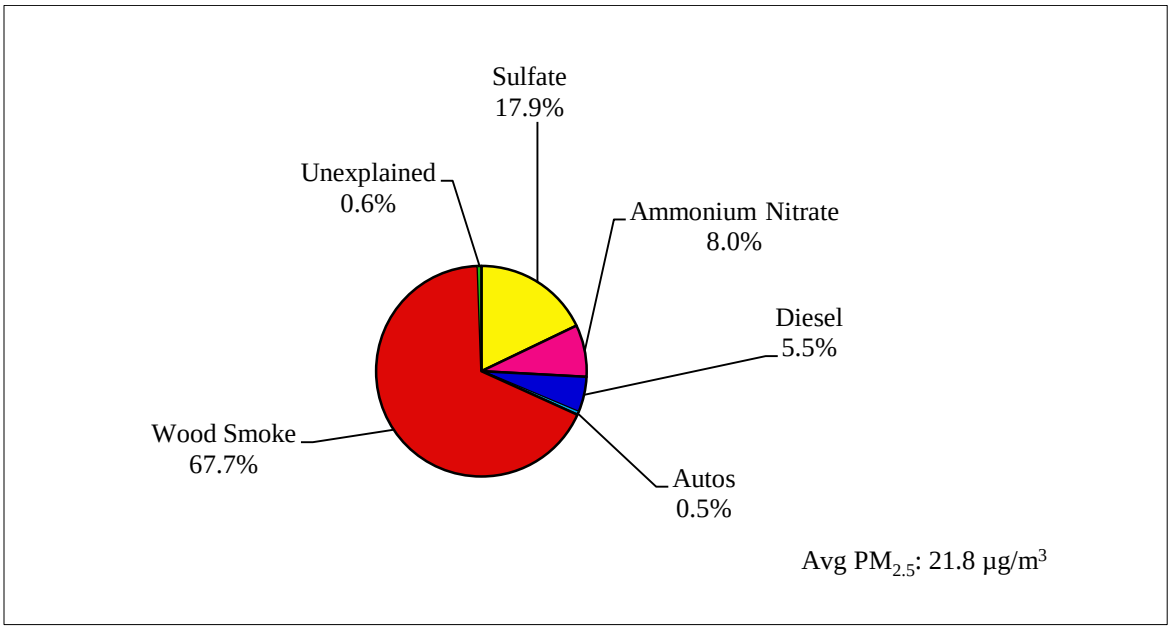

Figure 58: Winter 2012/2013, State Building.
CMB Results with OMNI Source Profiles, November 2, 2012 – March 29, 2013.

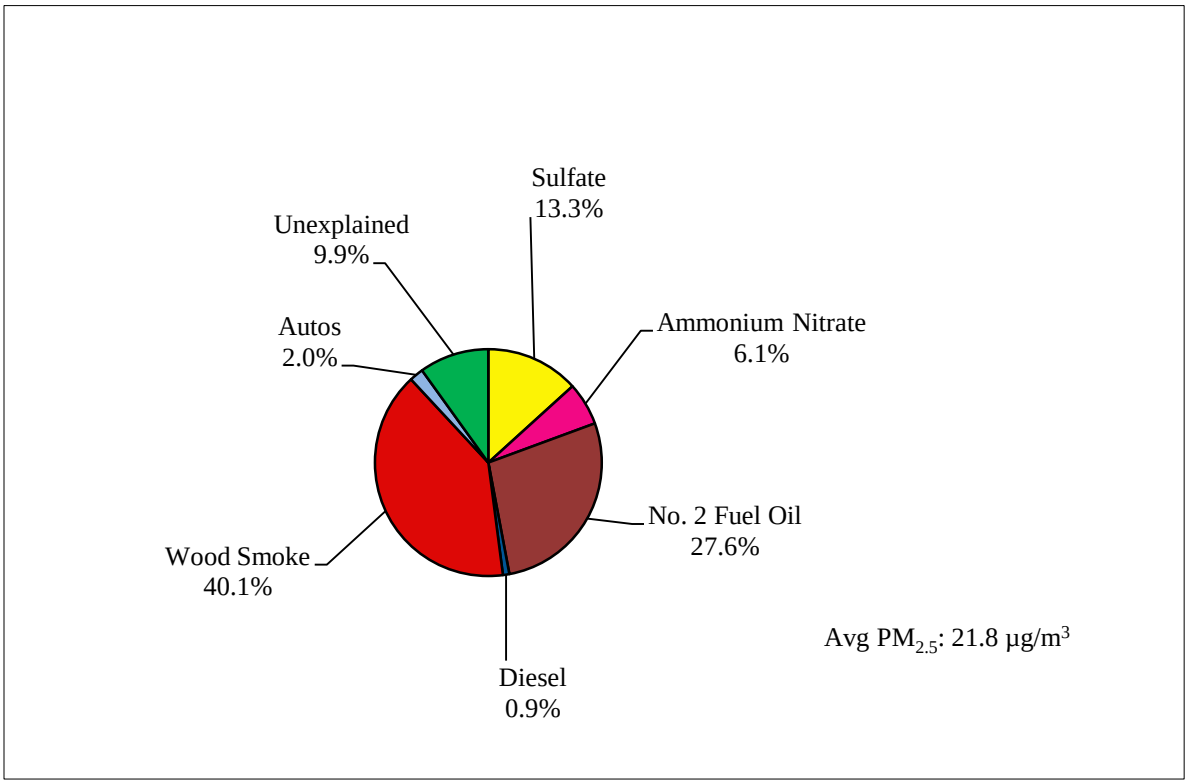

Table 37: Comparison of CMB Results - EPA and OMNI Source Profiles. State Building, Winter 2012/2013.

Season:	**Winter 2012/2013 (EPA)**	**Winter 2012/2013 (OMNI)**
Dates:	11/2/12-3/29/13	11/2/12-3/29/13
n:	29	29
$PM_{2.5}$ Mass (µg/m^3):	21.8	21.8
CMB Source Estimates (µg/m^3 and %)		
Sulfate:	3.9 (17.9 %)	2.9 (13.3 %)
Ammonium Nitrate:	1.7 (8.0 %)	1.3 (6.1 %)
Diesel:	1.2 (5.5 %)	0.2 (0.9 %)
Automobiles:	0.1 (0.5 %)	0.4 (2.0 %)
Wood Smoke:	14.7 (67.7 %)	8.7 (40.1 %)
No. 2 Fuel Oil:	Not Identified	6.0 (27.6 %)
Unexplained:	0.1 (0.6 %)	2.1 (9.9 %)

Figure 59: Winter 2012/2013, NPE.
CMB Results with EPA Source Profiles, November 2, 2012 – March 29, 2013.

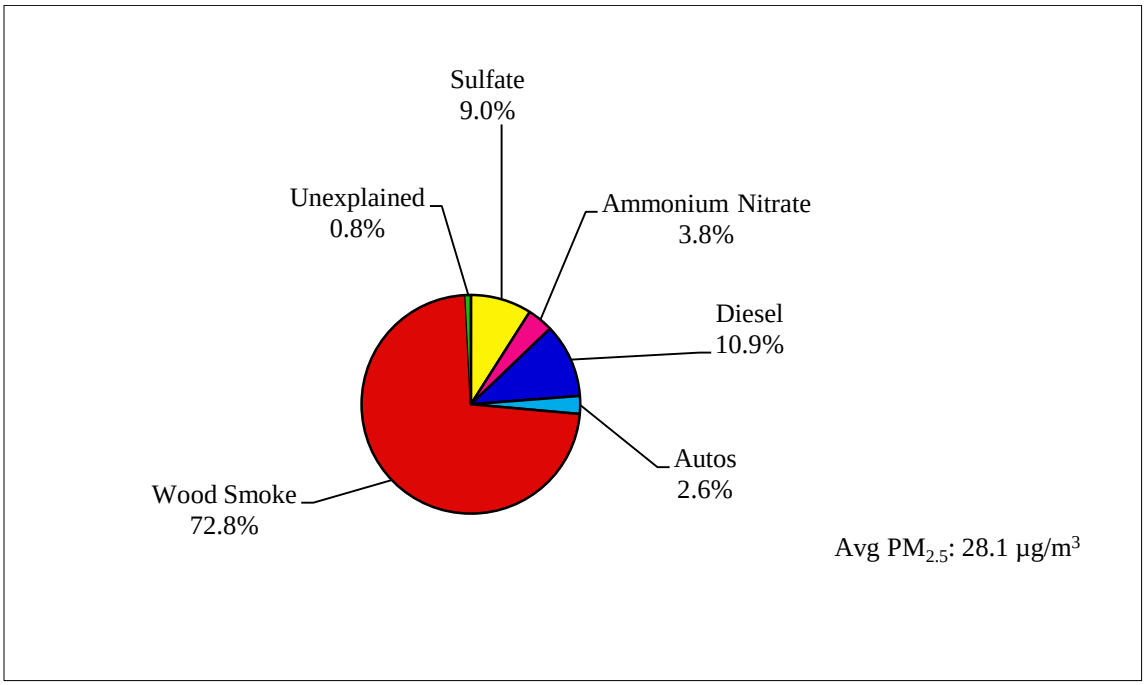

Figure 60: Winter 2012/2013, NPE.
CMB Results with OMNI Source Profiles, November 2, 2012 – March 29, 2013.

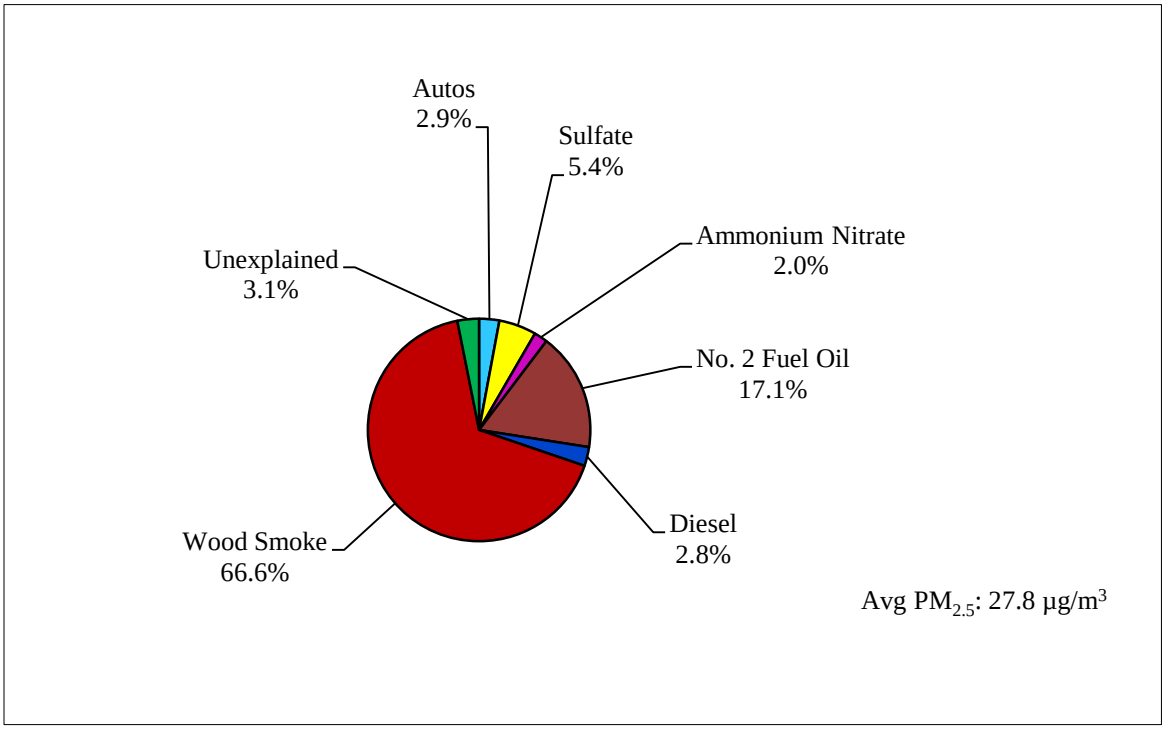

Table 38: Comparison of CMB Results - EPA and OMNI Source Profiles. NPE, Winter 2012/2013.

Season:	**Winter 2012/2013 (EPA)**	**Winter 2012/2013 (OMNI)**
Dates:	11/2/12-3/29/13	11/2/12-3/29/13
n:	41	40
$PM_{2.5}$ Mass (µg/m^3):	28.1	27.8
CMB Source Estimates (µg/m^3 and %)		
Sulfate:	2.5 (9.0 %)	1.5 (5.4 %)
Ammonium Nitrate:	1.1 (3.8 %)	0.6 (2.0 %)
Diesel:	3.0 (10.9 %)	0.8 (2.8 %)
Automobiles:	0.7 (2.6 %)	0.8 (2.9 %)
Wood Smoke:	20.3 (72.8 %)	18.8 (66.6 %)
No. 2 Fuel Oil:	Not Identified	4.9 (17.1 %)
Unexplained:	0.2 (0.8 %)	0.9 (3.1 %)

Figure 61: Winter 2012/2013, NCORE.
CMB Results with EPA Source Profiles, November 2, 2012 – March 29, 2013.

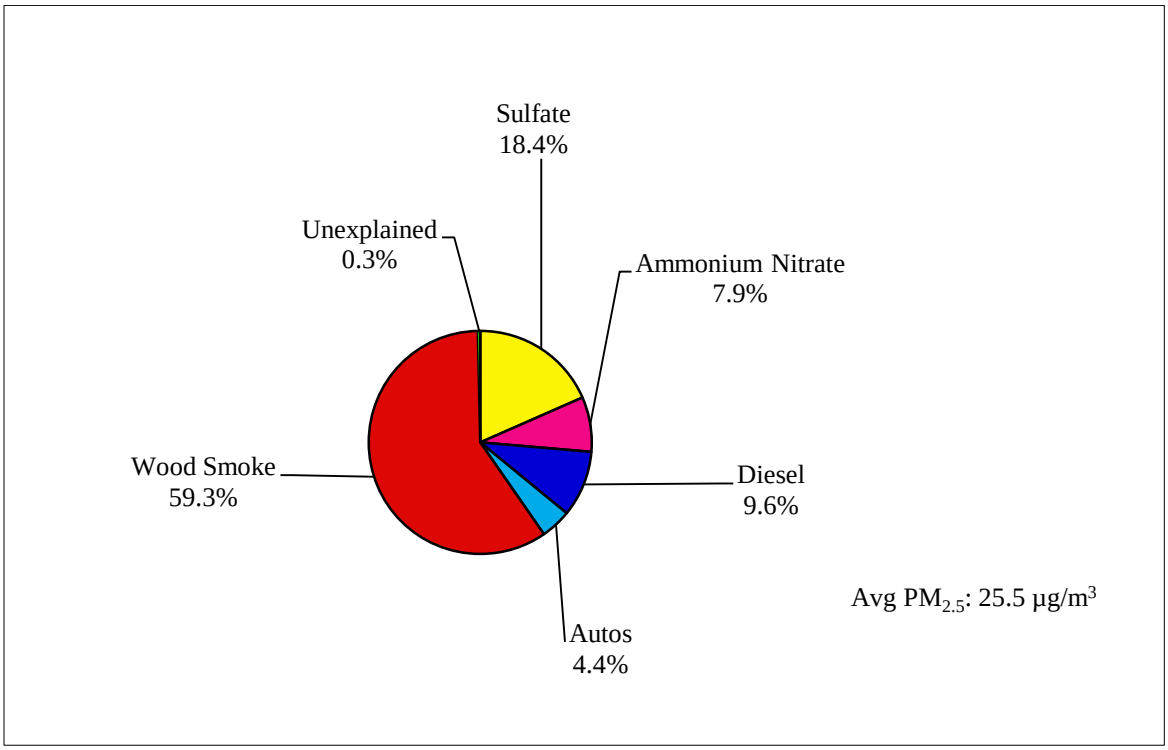

Figure 62: Winter 2012/2013, NCORE.
CMB Results with OMNI Source Profiles, November 2, 2012 – March 29, 2013.

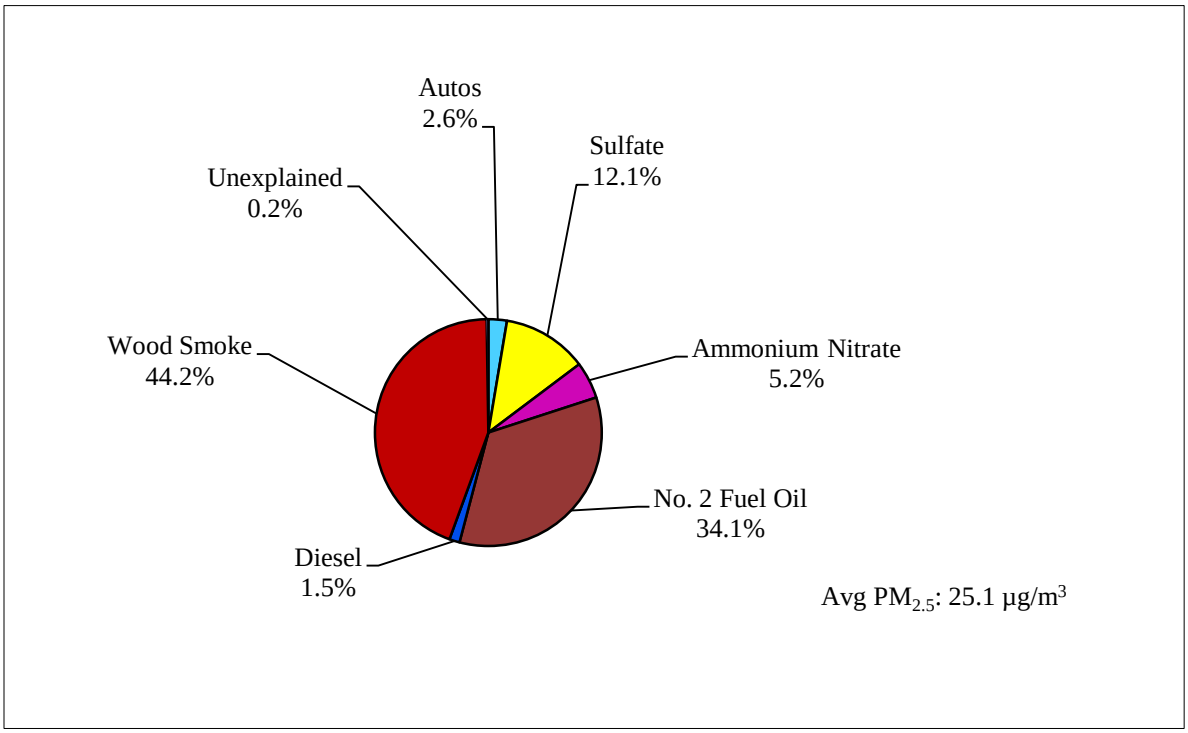

Table 39: Comparison of CMB Results - EPA and OMNI Source Profiles. NCORE, Winter 2012/2013.

Season:	**Winter 2012/2013 (EPA)**	**Winter 2012/2013 (OMNI)**
Dates:	11/2/12-3/29/13	11/2/12-3/29/13
n:	38	39
$PM_{2.5}$ Mass (µg/m^3):	25.5	25.1
CMB Source Estimates (µg/m^3 and %)		
Sulfate:	4.7 (18.4 %)	3.0 (12.1 %)
Ammonium Nitrate:	2.0 (7.9 %)	1.3 (5.2 %)
Diesel:	2.4 (9.6 %)	0.4 (1.5 %)
Automobiles:	1.1 (4.4 %)	0.7 (2.6 %)
Wood Smoke:	15.1 (59.3 %)	11.0 (44.2 %)
No. 2 Fuel Oil:	Not Identified	8.5 (34.1 %)
Unexplained:	0.1 (0.3 %)	0.1 (0.2 %)

Figure 63: Winter 2012/2013, NPF3.
CMB Results with EPA Source Profiles, November 2, 2012 – March 29, 2013.

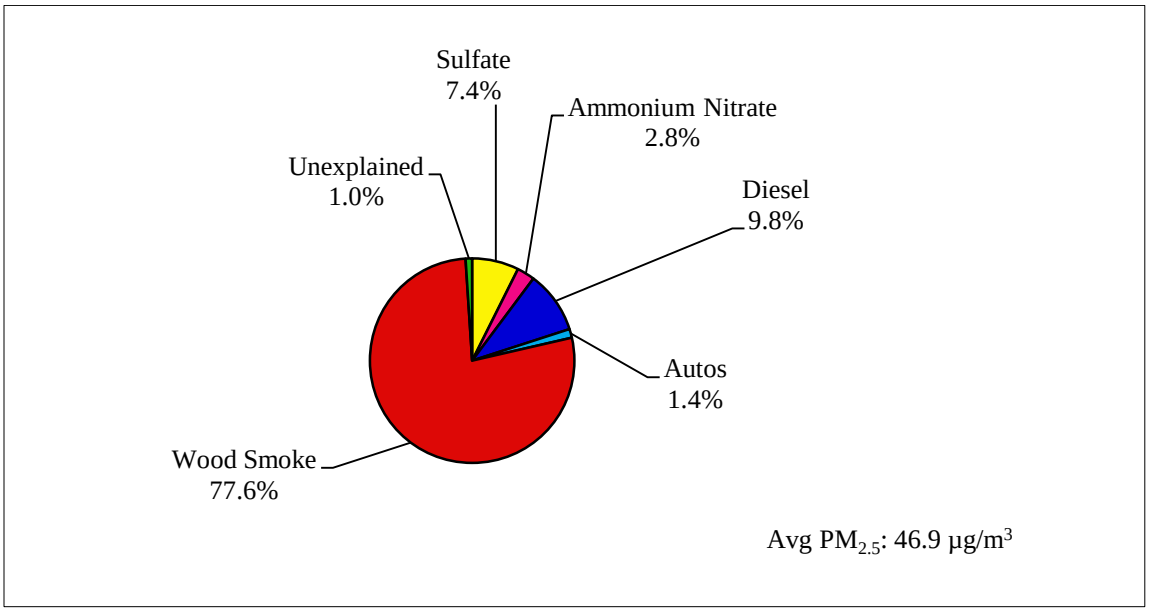

Figure 64: Winter 2012/2013, NPF3.
CMB Results with OMNI Source Profiles, November 2, 2012 – March 29, 2013.

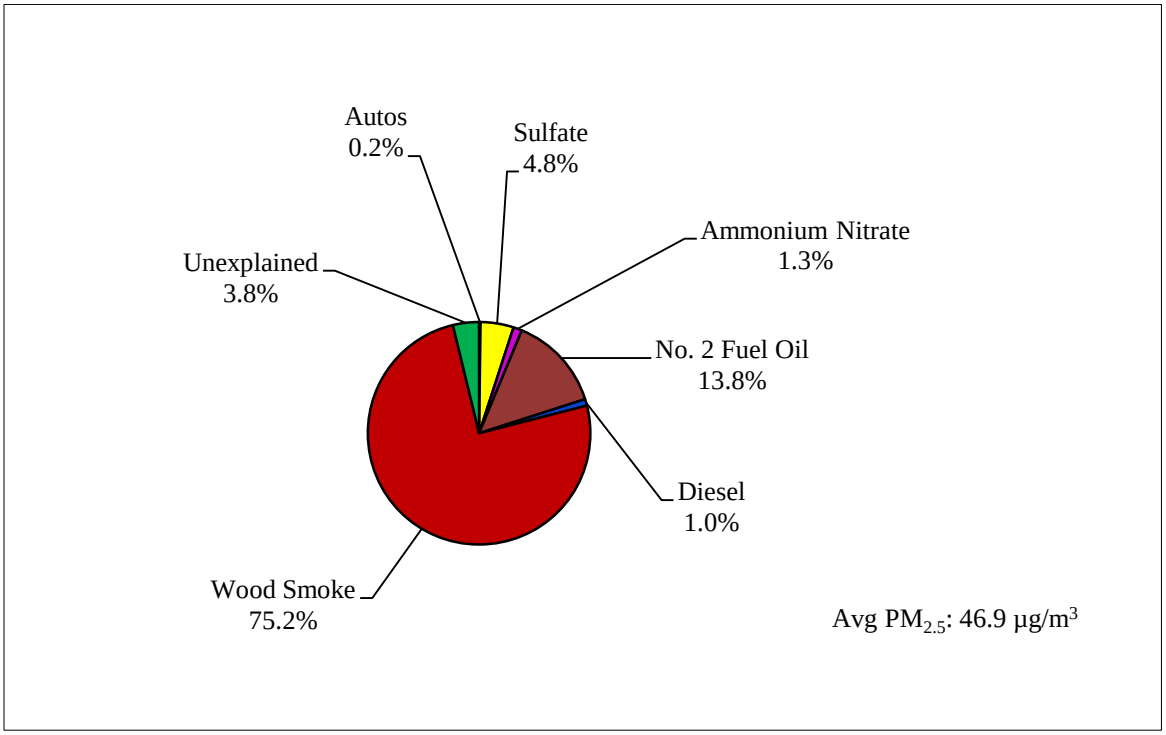

Table 40: Comparison of CMB Results - EPA and OMNI Source Profiles. NPF3, Winter 2012/2013.

Season:	**Winter 2012/2013 (EPA)**	**Winter 2012/2013 (OMNI)**
Dates:	11/2/12-3/29/13	11/2/12-3/29/13
n:	42	42
$PM_{2.5}$ Mass (µg/m^3):	46.9	46.9
CMB Source Estimates (µg/m^3 and %)		
Sulfate:	3.4 (7.4 %)	2.2 (4.8 %)
Ammonium Nitrate:	1.3 (2.8 %)	0.6 (1.3 %)
Diesel:	4.5 (9.8 %)	0.4 (1.0 %)
Automobiles:	0.6 (1.4 %)	0.1 (0.2 %)
Wood Smoke:	35.9 (77.6 %)	34.7 (75.2 %)
No. 2 Fuel Oil:	Not Identified	6.4 (13.8 %)
Unexplained:	0.5 (1.0 %)	1.8 (3.8 %)

8.0. Discussion - CMB Modeling

The Tables in **Appendix C** present the $PM_{2.5}$ sources identified by the CMB model (including source contribution estimates and standard errors) for each sample day throughout the program using both EPA and OMNI profiles. The standard error is a single standard deviation. When a standard error value is multiplied by two or three times, the result may be taken as a measure of the upper and lower limit of an individual source's contribution. There is about a 66% probability that the true source contribution is within one standard error and about a 95% probability that the true contribution is within two standard errors of the source contribution estimate. Below is a more complete discussion of the individual source types identified by the CMB modeling.

8.1. Wood Smoke

The wood smoke source identified by the CMB model during the winter months should be viewed as a general source predominantly composed of wood stove emissions. In addition to residential wood stoves, other biomass combustion emission sources could have contributed to the wood smoke results in Fairbanks, including smoke from outdoor boilers, residential open burning of biomass waste, and small industrial sources. A source profile (Profile 56 in **Table 1**) developed in Missoula, Montana in the late 1980s served as a good statistically fitting wood smoke profile when using the non-OMNI profiles for each of the winters/sites when conducting the Fairbanks CMB analyses. It should also be noted that many other residential wood combustion source profiles from the EPA SPECIATE database gave good statistical fits throughout the computer modeling process for each of the sites, including the following wood smoke profiles listed in **Table 1**: 61, 62, 65, and 66. When compared to profiles of other sources, these wood smoke profiles typically had higher levels of elemental potassium, potassium ion, and OC. Generally, both elemental potassium and the potassium ion gave good fits when modeling, with the elemental form usually providing the better statistical fit.

When focusing on the OMNI profiles in the CMB model, FBK107 (EPA Wood Stove, spruce, low) gave the best statistical fit. However, other OMNI profiles for wood smoke combustion were statistically significant as well, and were used in the CMB modeling: FBK101 (EPA OWHH, Birch, Low), FBK102 (Conventional Wood Stove, Birch, Low), and FBK100 (EPA Wood Stove, Birch, Low). Given that all of these wood smoke profiles (both EPA and OMNI) provided strong statistical fits (i.e. gave the best results), this supports that wood smoke (likely from residential wood combustion) is a major source of $PM_{2.5}$ in the Fairbanks airshed throughout the winter months. It should also be noted that wood smoke was determined to be the largest source of $PM_{2.5}$ at both the State Building and NCORE sites (56-72%) during the summer of 2012, likely due to residential outdoor biomass waste burning and influences from regional wildland forest fire events.

8.2. Secondary Pollutants

"Pure secondary" aerosols such as ammonium nitrate and sulfate are actually formed through gas-to-particle transformations in the atmosphere, and are represented by their chemical form in the model. As noted earlier, one assumption of the CMB model is that compositions of source emissions are constant over the period of ambient and source sampling, and that chemical species do not react with each other. CMB is well suited for apportioning sources of primary aerosols (those emitted directly as particles). However, it is difficult to attribute secondary aerosols formed through gas-to-particle transformation in the atmosphere to specific sources. Using the secondary sulfate and the ammonium nitrate profiles allows us to account for the secondary aerosol contributions to $PM_{2.5}$ mass.

Sulfate is a large source contributor to ambient $PM_{2.5}$, representative of particles directly emitted during combustion and secondary particles formed in the atmosphere. Sulfate is a function of the sulfur content of the fuels burned in the Fairbanks community. Recent regulations have all but eliminated sulfur from

gasoline and diesel fuel in Alaska. Therefore, the fuels contributing sulfur (and sulfate) to the Fairbanks airshed likely include distillate fuel oil used in space heating and coal combustion. Ammonium nitrate (NH_4NO_3) is a secondary pollutant that was also identified frequently by the CMB model at each of the sites. Identified source contributions were very similar when using the EPA and OMNI profiles, with slightly less sulfate and ammonium nitrate identified when using the OMNI profiles. It should be noted that even though ammonium sulfate was not detected by the CMB model as a $PM_{2.5}$ source (secondary) when both sulfate and ammonium nitrate were used as fitting species, it is likely a significant contributor to the measured $PM_{2.5}$ levels. When using the secondary sulfate source profile in the model, sulfur was used as the fitting species in each model run to apportion sulfate contributions.

Ammonia (NH_3) and oxides of nitrogen (NOx) are the precursors for ammonium nitrate particles, with just under half all NOx emissions in the United States estimated to come from the transportation sector (Seinfeld and Pandis, 1998; Dreher and Harley, 1998). $PM_{2.5}$ has been found to correlate with gaseous emissions of NOx from vehicles, with heavy duty vehicles contributing significantly greater amounts of NOx and particulate matter on a per vehicle basis than light duty vehicles (Gillies et al., 2001). Between 40 and 45% of all NOx emissions in the United States are estimated to come from transportation, with about half of this coming from light-duty gasoline trucks and cars and approximately one-quarter from heavy-duty gasoline and diesel vehicles (Seinfeld and Pandis, 1998; Dreher and Harley, 1998). Other sources of NOx in Fairbanks might include industry, natural gas furnaces, and residential wood combustion. In other parts of the lower 48, ammonia emissions to the atmosphere can arise from many sources including the decay of livestock waste, use of chemical fertilizers, emissions from sewage waste treatment plants, and biological processes in soils (Fraser and Cass, 1998). In Fairbanks, combustion processes such as motor vehicles likely are a significant source of ammonia.

8.3. Mobile Sources

Profiles for this source group typically had higher levels of EC when compared to the wood smoke profiles. When using the EPA profiles, the CMB model determined that vehicles were a measurable source of $PM_{2.5}$ at each of the sites throughout the winter months. Automobile exhaust (gasoline-powered) contributions to $PM_{2.5}$ were detected at the sites up to 7%. Diesel exhaust was also measured at each of the sites, contributing up to 11%. When using the OMNI wood smoke and fuel oil profiles in the CMB model, mobile sources were identified as being smaller contributors to the ambient $PM_{2.5}$. For the majority of the CMB runs using OMNI profiles, both automobiles and diesel exhaust were found to typically contribute less than 6% to the overall ambient $PM_{2.5}$.

8.4. Other Sources

When conducting CMB modeling using the EPA source profiles, there were other sources identified by the CMB model as contributors to the ambient $PM_{2.5}$. However, these sources were not identified as statistically significant contributors (i.e. evaluated based on CMB model statistical criteria). These sources include the following: street sand, distillate oil combustion, natural gas combustion, residual oil combustion, and sub bituminous coal combustion. Street sand was detected by the CMB model from filters collected during the early spring, but never in concentrations that were considered statistically significant (TSTAT >2). In addition, the source profile for natural gas combustion was identified on several occasions, but never in amounts that were statistically significant.

Regarding the combustion sources such as distillate oil, residual oil, and sub bituminous coal, primary $PM_{2.5}$ emissions were not identified as being statistically significant from these individual sources. To investigate this further, the CMB model was run with both the EPA SPECIATE distillate oil and coal profile in the model, and in the absence of the secondary sulfate profile (using both the sulfur and sulfate fitting species). In both instances, the model provided very poor statistical fits. Using the secondary

sulfate profile (as a potential surrogate for these sources) provided excellent statistical fits on nearly every sample run.

When using the OMNI profiles in the CMB modeling, the No. 2 fuel oil profile (FBK103) was consistently identified as a source of $PM_{2.5}$ at each of the sites during all winters. The other OMNI profiles for coal, including FBK104 (Coal Stove, Wet Stoker Coal, Low), FBK105 (Coal HH, Wet Stoker Coal, Single), and 108 (Coal Stove Dry Lump Coal, low) were not identified in the CMB model. Similarly, the OMNI profile for waste oil (FBK106, WasteOil Brnr, Waste Oil, Single) was not identified by the CMB model to be a source of $PM_{2.5}$ at any of the other sites (for each year).

9.0. Quality Assurance / Quality Control Results

9.1. Sampling Program QA/QC

For the Fairbanks sampling program, Alaska DEC and FNSB personnel maintained and audited the $PM_{2.5}$ samplers at each of the sites. There were several days throughout the program where samples were not collected (and therefore CMB analyses were not conducted) due to sampler malfunctions. These sample days are identified in **Appendix B**. In addition, CMB source apportionment was not conducted on additional sample days during the winter months due to low $PM_{2.5}$ mass. If the measured $PM_{2.5}$ concentration is less than 7 $\mu g/m^3$, the percent mass may be outside of the acceptable ranges because the uncertainty in the mass measurement is approximately 1 to 2 $\mu g/m^3$. These days are also identified in **Appendix B**. These low mass days were primarily excluded for the winter days when the ambient $PM_{2.5}$ concentrations were much higher. During the summer 2012 sample days, CMB modeling runs were conducted on all days (regardless of ambient $PM_{2.5}$ mass concentrations) in an effort to identify the sources during these low-mass days.

9.2. Analytical Program QA/QC

RTI (speciation analyses) and Desert Research Institute were responsible for QA/QC activities within their respective laboratories. To monitor for artifact contamination in the field and in the laboratory, Teflon, nylon, and quartz filter field blanks were collected throughout the sampling programs. The results of the $PM_{2.5}$ speciation field blank analyses show that the Teflon and quartz filters collected throughout the program did not measure significant artifacts for mass, elements, or Total Carbon. Several ions measured from the nylon filter blanks had levels above the MDLs, including sulfate, nitrate, ammonium, and sodium. Care was taken when utilizing these ions as fitting species to avoid inaccurate source apportionment to the fine PM.

9.3. CMB Program QA/QC

EPA's validation protocol (Watson et al., 2004) was followed throughout this CMB modeling program to ensure accurate results. For each model run, several different combinations of source profiles were evaluated, and the number of chemical species always exceeded the number of source types. The source contribution estimates and the statistics and diagnostic information were reviewed for each model run to determine the validity of the initial model results. The analysis was repeated by eliminating source profiles that gave negative source contribution estimates or standard errors that exceeded the source contribution estimates. When conducting the CMB model runs, only sources with TSTATs >2 were reported. If a TSTAT was <2, then the source was not considered a significant contributor for that sample day.

The majority of the CMB fitting parameters used to evaluate the validity of source contribution estimates were well within EPA target ranges. **Tables 41** (CMB with EPA profiles) **and 42** (CMB with OMNI profiles) present the program average key 'goodness-of-fit' statistics commonly evaluated for CMB models, the results for the Fairbanks CMB runs, and the EPA target ranges for each parameter.

The values for R^2, Chi^2, DF, and % mass explained for each CMB model run were generally well within the EPA target ranges. For the most part, the R/U ratios were all less than 2, and source collinearity (similarities between identified sources) was not a problem throughout this modeling application.

Table 41: Average Goodness-Of-Fit Parameter - EPA Profiles.

	R^2	Chi^2	Degrees of Freedom	% Mass Explained	TSTAT
EPA Target	**0.8 - 1.00**	**0.00 – 4.0**	**> 5**	**80 – 120%**	**>2**
State Building, 2005/2006	0.94	0.35	27	99.7	>2
State Building, 2006/2007	0.95	0.27	26	98.4	>2
State Building, 2007/2008	0.96	0.21	32	100.1	>2
2008/2009	**R^2**	**Chi^2**	**Degrees of Freedom**	**% Mass Explained**	**TSTAT**
State Building	0.95	0.25	28	99.3	>2
North Pole	0.98	0.11	37	99.2	>2
RAMS	0.96	0.19	37	100.5	>2
Peger Road	0.98	0.09	36	99.5	>2
2009/2010	**R^2**	**Chi^2**	**Degrees of Freedom**	**% Mass Explained**	**TSTAT**
State Building	0.96	0.34	37	99.4	>2
North Pole	0.97	0.17	36	99.0	>2
RAMS	0.98	0.07	36	99.9	>2
Peger Road	0.98	0.13	36	99.2	>2
2010/2011	**R^2**	**Chi^2**	**Degrees of Freedom**	**% Mass Explained**	**TSTAT**
State Building	0.98	0.19	38	100.0	>2
North Pole	0.97	0.15	35	99.4	>2
Peger Road	0.98	0.10	36	99.7	>2
2011/2012	**R^2**	**Chi^2**	**Degrees of Freedom**	**% Mass Explained**	**TSTAT**
State Building	0.96	0.25	37	99.0	>2
North Pole	0.97	0.18	38	98.1	>2
RAMS	0.98	0.13	37	98.3	>2
NCORE	0.97	0.18	37	98.8	>2
NPF3	0.98	0.10	36	101.0	>2
Summer 2012	**R^2**	**Chi^2**	**Degrees of Freedom**	**% Mass Explained**	**TSTAT**
State Building	0.98	0.39	38	93.1	>2
NCORE	0.89	0.56	38	107.7	>2

2012/2013	**R^2**	**Chi^2**	**Degrees of Freedom**	**% Mass Explained**	**TSTAT**
State Building	0.96	0.27	38	99.4	>2
NPE	0.97	0.17	35	99.2	>2
NCORE	0.96	0.22	36	99.7	>2
NPF3	0.97	0.21	35	99.0	>2

Note: ND: not detected by the CMB model. Sampling was not conducted at the RAMS site during the winter of 2010/2011.

Table 42: Average Goodness-Of-Fit Parameters - OMNI Profiles.

	R^2	**Chi^2**	**Degrees of Freedom**	**% Mass Explained**	**TSTAT**
EPA Target	**0.8 - 1.00**	**0.00 – 4.0**	**> 5**	**80 – 120%**	**>2**
State Building, 2005/2006	0.98	0.17	22	98.1	>2
State Building, 2006/2007	0.99	0.15	19	100.1	>2
State Building, 2007/2008	0.99	0.13	25	100.1	>2
2008/2009	**R^2**	**Chi^2**	**Degrees of Freedom**	**% Mass Explained**	**TSTAT**
*State Building	0.96	0.40	19	96.1	>2
**State Building	0.99	0.18	20	99.5	>2
North Pole	0.97	0.36	29	96.8	>2
RAMS	0.97	0.27	28	100.9	>2
*Peger Road	0.98	0.19	28	98.4	>2
**Peger Road	0.99	0.12	28	99.7	>2
2009/2010	**R^2**	**Chi^2**	**Degrees of Freedom**	**% Mass Explained**	**TSTAT**
State Building	1.0	0.13	28	96.1	>2
North Pole	0.97	0.67	27	100.6	>2
RAMS	0.98	0.49	28	100.1	>2
Peger Road	0.99	0.15	28	98.9	>2
2010/2011	**R^2**	**Chi^2**	**Degrees of Freedom**	**% Mass Explained**	**TSTAT**
State Building	1.0	0.10	29	92.6	>2
North Pole	0.97	0.65	28	99.4	>2
Peger Road	0.99	0.21	28	101.4	>2
2011/2012	**R^2**	**Chi^2**	**Degrees of Freedom**	**% Mass Explained**	**TSTAT**
State Building	1.0	0.16	27	93.3	>2
North Pole	0.97	0.37	29	95.5	>2
RAMS	0.98	0.17	29	91.6	>2

NCORE	0.99	0.13	29	99.5	>2
NPF3	0.98	0.24	29	97.8	>2
Summer 2012	**R^2**	**Chi^2**	**Degrees of Freedom**	**% Mass Explained**	**TSTAT**
State Building	1.0	0.38	30	84.4	>2
NCORE	0.90	0.62	35	108.3	>2
2012/2013	**R^2**	**Chi^2**	**Degrees of Freedom**	**% Mass Explained**	**TSTAT**
State Building	1.0	0.11	29	90.2	>2
NPE	0.98	0.35	27	96.8	>2
NCORE	0.99	0.10	27	100.2	>2
NPF3	0.98	0.39	27	96.3	>2

Note: ND: not detected by the CMB model. Sampling was not conducted at the RAMS site during the winter of 2010/2011. *Averages originally presented in the Final Report submitted to ADEC (dated July 23, 2012). **Averages for those sample days in which updated CMB modeling (with OMNI profiles as well as auto/diesel profiles) was conducted.

It is believed that all of the $PM_{2.5}$ emission sources (or at least the source types) were identified during this CMB modeling program. Missing source types are identified by a low percent mass explained (<80%) and/or a RATIO R/U <<-2.0 for chemical species which are in the missing source. In addition, a "high negative" residual for one or more species and a large Chi^2 can be indicative of missing sources. The good agreement between the calculated source contributions and the measured ambient concentrations indicate that all of the major source types are included in the calculations, and that ambient and source profile measurements are reasonably accurate. CMB is intended to complement rather than replace other data analysis and modeling methods. For this project, the sensitivity of the CMB model's results to the errors in the source profiles were evaluated by using different chemical abundances of a source type and by changing the fitting species used in the source type. The results of the sensitivity tests for each run showed that the CMB calculations carried out in this study were acceptable. Although there were a few cases where the fitting parameters were outside the EPA target range, none of these cases were considered invalid, and all of the fits were quite strong. Therefore, the source contribution estimates identified in this project can be considered valid.

10.0. References

Carlson, J., 1990. PM_{10} Chemical Mass Balance study for Missoula, Montana. Missoula City-County Health Department (MCCHD).

Cooper, J.A., Watson, J.G., 1980. Receptor oriented methods of air particulate source apportionment. *JAPCA*, 30, 1116-25.

Dreher D.B., Harley, R.A., 1998. A Fuel-Based Inventory for Heavy-Duty Diesel Truck Emissions, *J. Air & Waste Manage. Assoc.*, 48, 352-358.

Fraser, M.P., Cass, G.R., 1998. Detection of excess ammonia emissions from in-use vehicles and the implications for fine particle control. *Environ. Sci. Technol.*, 32, 1053-1057.

Friedlander, S.K., 1973. Chemical element balances and identification of air pollution sources. *Environ. Sci. Technol.*, 7, 235-240.

Gillies, J.A., Gertler, A.W., Sagebiel, J.C., Dippel, W.A., 2001. On-road particulate matter ($PM_{2.5}$ and PM_{10}) emissions in the Sepulveda tunnel, Los Angeles, California. *Environ. Sci. Technol.*, 35, 1054-1063.

Gordon, G.E., 1980. Receptor models. *Environ. Sci. Technol*., 14, 792-800.

Gordon, G.E., 1988. Receptor models. *Environ. Sci. Technol*., 22, 1132-1142.

Hidy, G.M., Venkataraman, C., 1996. The chemical mass balance method for estimating atmospheric particle sources in Southern California. *Chem. Eng. Comm*., 151, 187-209.

RTI International, 2008. SOP for Particulate Matter (PM) Gravimetric Analysis, July 8, 2008, http://www.epa.gov/ttn/amtic/files/ambient/pm25/spec/RTIGravMassSOPFINAL.pdf (accessed 10/7/2011).

RTI International, 2009a. SOP for the X-Ray Fluorescence Analysis of Particulate Matter Deposits on Teflon Filters, August 19, 2009,
http://www.epa.gov/ttn/amtic/files/ambient/pm25/spec/pmxrfsop.pdf (accessed 10/7/2011).

RTI International, 2009b. SOP for $PM_{2.5}$ Cation Analysis, August 25, 2009, http://www.epa.gov/ttn/amtic/files/ambient/pm25/spec/pm25cationsop.pdf (accessed 10/7/2011).

RTI International, 2009c. SOP for $PM_{2.5}$ Anion Analysis, August 26, 2009, http://www.epa.gov/ttn/amtic/files/ambient/pm25/spec/pm25anionsop.pdf (accessed 10/7/2011).

RTI International, 2009d. SOP for the Determination of Organic, Elemental, and Total Carbon in Particulate Matter Using a Thermal / Optical-Transmittance Carbon Analyzer, February 16, 2009, http://www.epa.gov/ttn/amtic/files/ambient/pm25/spec/RTIOCECSOP.pdf (accessed 10/7/2011).

Schmidt, B., 1996. Chemical Mass Balance source apportionment of Missoula, Montana 1995/1996 winter suspended particulate matter. Missoula City-County Health Department (MCCHD).

Seinfeld, J.H., Pandis, S.N., 1998. *Atmospheric Chemistry and Physics. From Air Pollution to Climate Change*, New York, John Wiley & Sons.

USEPA, 2006. SPECIATE 4.0: EPA's repository of Total Organic Compound (TOC) and Particulate Matter (PM) speciated profiles for a variety of sources for use in source apportionment studies. U.S. Environmental Protection Agency OAQPS, Research Triangle Park, NC. http://www.epa.gov/ttn/chief/software/speciate/ index.

Ward, T.J., and Smith, G.C., 2005. The 2000/2001 Missoula Valley $PM_{2.5}$ Chemical Mass Balance study, including the 2000 wildfire season – seasonal source apportionment, *Atmospheric Environment*, 39, 709-717.

Watson, J.G., 1984. Overview of receptor model principles. *JAPCA*, 34, 619-623.

Watson, J.G., Cooper, J.A., Huntzicker, J.J., 1984. The effective variance weighting for least squares calculations applied to the mass balance receptor model. *Atmos. Environ.*, 18, 7, 1347-1355.

Watson, J.G., Robinson, N.F., Chow, J.C., Henry, R.C., Kim, B.M., Pace, T.G., Meyer, E.L., Nguyen, Q., 1990. The USEPA/DRI chemical mass balance receptor model, CMB 7.0. *Environ. Software*, 5, 38-49.

Watson, J.G., et al., 2004. Protocol for Applying and Validating the CMB Model for $PM_{2.5}$ and VOC. Report No. EPA-451/R-04-001, USEPA QAQPS.

Appendix A. OMNI Source Profiles

	FBK100	FBK101	FBK102	FBK103	FBK104	FBK105	FBK106	FBK107	FBK108
	OMNI_5_WS	OMNI_9_OW	OMNI_15_W	OMNI_17_O	OMNI_23_C	OMNI_29_C	OMNI_18_W	OMNI_6_WS	OMNI_38_C
	FINE	FINE	FINE	FINE	FINE	FINE	FINE	FINE	FINE
Magnesium	0.000128902	0.000179751	6.69E-05	0	0	0.003971831	0.002287551	0	0
aluminum	8.06E-05	0	0	0.003478261	6.87E-05	0.007352113	0.000792668	0.0002849	0.000276817
silicon	0	0	0	0.001014493	0	0.01343662	0.000284456	0	0.000138408
phosphorus	0	0	0	0	0	0.00056338	0.083318258	0	0
sulfur	0.004114804	0.005342382	0.006735058	0.060289855	0.002835052	0.131014085	0.022316115	0.002393162	0.004273356
chlorine	0.002239678	0.003898264	0.002305977	0.00115942	0.000790378	0.000676056	0.213184956	0.002336182	0.00032872
potassium	0.018032226	0.026834189	0.021868867	0.001449275	0.000137457	0.03828169	0.044103785	0.008091168	0.000207612
calcium	0.00023565	0.000577158	7.14E-05	0.002753623	0.000120275	0.030732394	0.021598429	0.001168091	0.000155709
titanium	0	1.22E-06	0	0	3.44E-05	0.000450704	0	0	0
vanadium	8.06E-06	0	0	0	1.72E-05	0.000140845	0	0	0
chromium	2.62E-05	1.10E-05	0	0	0	0.000591549	0	2.85E-05	1.73E-05
manganese	3.42E-05	2.57E-05	2.68E-05	0	0	0.000507042	0	5.70E-05	0
iron	0.00012286	3.79E-05	1.78E-06	0.001449275	0.000171821	0.022	0.005232088	8.55E-05	8.65E-05
nickel	1.01E-05	1.22E-06	4.46E-06	0.000144928	1.72E-05	0.000422535	0	0.00017094	0
copper	1.61E-05	1.71E-05	0	0.000144928	0	0.003267606	0	0	0
zinc	0.003689829	0.003307655	0.003407672	2.90E-05	0.000120275	0.006704225	0.160667698	0.000826211	0.000155709
gallium	-99	-99	-99	-99	-99	-99	-99	-99	-99
germanium	-99	-99	-99	-99	-99	-99	-99	-99	-99
arsenic	0	0	4.46E-06	0	1.72E-05	0.000647887	0	0	0
selenium	0	0	0	0	0	0.000112676	0	0	0
bromine	1.81E-05	1.96E-05	2.23E-05	0	0	0.000309859	0.000217805	2.85E-05	3.46E-05
rubidium	3.02E-05	2.93E-05	2.23E-05	0	0	0.000253521	0	0	0
strontium	6.04E-06	6.11E-06	0	0	0	0.000309859	0	2.85E-05	0
yttrium	-99	-99	-99	-99	-99	-99	-99	-99	-99
zirconium	0	2.45E-06	0	0	8.59E-05	0.000422535	0	0	0
molybdenum	-99	-99	-99	-99	-99	-99	-99	-99	-99
palladium	-99	-99	-99	-99	-99	-99	-99	-99	-99

silver	-99	-99	-99	-99	-99	-99	-99	-99	-99
cadmium	0	0	0	0	0.000120275	0	0	0	0
indium	4.63E-05	0	0	0.002173913	0.000137457	0	0	0	0
tin	1.61E-05	0	0	0	0	0	0	0	0
antimony	0	0	0	0	0	0.000535211	0	0	0
barium	2.42E-05	9.78E-06	0	0	0	0.001183099	0	2.85E-05	0
lanthanum	-99	-99	-99	-99	-99	-99	-99	-99	-99
mercury	-99	-99	-99	-99	-99	-99	-99	-99	-99
lead	0.000002	0.000013	0.000009	0	0.000017	0.005352	0.001751	0.000028	0.000104
TC	-99	-99	-99	-99	-99	-99	-99	-99	-99
OC	2.115074382	0.481054286	0.687010777	0.518922229	0.649153878	0.08233928	0.009590277	0.777831363	0.666746667
EC	0.190318936	0.043286298	0.158647144	0.079583588	0.045820433	0.018000626	0.002592587	0.100578934	0.02072309
Sulfate	0.007468278	0.009576914	0.006347012	0.422985507	0.005257732	0.39943662	0.054980957	0.004928775	0.007958478
Nitrate	0.000968781	0.001228907	0.000677966	0.017057971	0.006185567	0.005380282	0.066209236	0.004245014	0.001608997
Ammonium	0.000104733	0.000132062	0	0.149318841	0.00128866	0.026225352	0	0.00017094	0.001799308
Chloride	-99	-99	-99	-99	-99	-99	-99	-99	-99
Potassium	0.015750252	0.022772071	0.016271186	0	0	0.036591549	0.040194001	0.007407407	0.000363322
Fluoride	-99	-99	-99	-99	-99	-99	-99	-99	-99
Sodium	0.000219537	0.000242113	0.000133809	0.003942029	0.000395189	0.041971831	0.06715782	0.000598291	0.000276817
Calcium	-99	-99	-99	-99	-99	-99	-99	-99	-99
Magnesium	-99	-99	-99	-99	-99	-99	-99	-99	-99
Sodium	0.0018429	0.001823184	0.00206512	0	0	0.046957746	0	0	0
Cobalt	6.04E-06	4.89E-06	4.46E-06	0	1.72E-05	0.000140845	0	1.14E-05	0

Appendix B. Days On Which CMB Modeling Was Not Conducted.

State Building Winter 2005/2006	Low $PM_{2.5}$ Mass ($\mu g/m^3$)	State Building Winter 2006/2007	Low $PM_{2.5}$ Mass ($\mu g/m^3$)	State Building Winter 2007/2008	Low $PM_{2.5}$ Mass ($\mu g/m^3$)
11/9/05	*	11/1/06	5.7**	11/14/07	*
11/18/05	4.3**	11/13/06	*	12/2/07	5.4**
11/24/05	*	11/16/06	*	12/14/07	4.0**
12/3/05	*	12/16/06	*	12/20/07	*
12/13/05	*	12/19/06	*	2/24/08	*
12/27/05	*	12/25/06	*	3/1/08	5.2**
1/2/05	*	1/9/07	*	3/7/08	5.8**
1/5/06	*	1/18/07	*	3/10/08	*
1/11/06	*	2/2/07	*	3/16/08	*
1/17/06	*	2/20/07	*	3/25/08	5.7**
2/4/06	*	3/1/07	*	3/31/08	5.7**
2/13/06	5.9**	3/7/07	*		
2/19/06	4.4**				
3/24/06	4.8**				

*No, incomplete, or invalid CMB data set.
**Mass was too small to conduct a CMB analysis.

State Building Winter 2008/2009	Low $PM_{2.5}$ Mass ($\mu g/m^3$)	North Pole Winter 2008/2009	Low $PM_{2.5}$ Mass ($\mu g/m^3$)
12/8/08	*	2/18/09	*
1/16/09	2.3**	3/5/09	4.7**
2/6/09	*	3/17/09	3.8**
3/5/09	5.7**	3/20/09	4.6**
3/20/09	*	3/23/09	4.5**
3/26/09	*	3/26/09	3.0**

*No, incomplete, or invalid CMB data set.
**Mass was too small to conduct a CMB analysis.
Note that 12/29/08 did not give a good fit for OMNI rerun for State Building site.

RAMS Winter 2008/2009	Low $PM_{2.5}$ Mass ($\mu g/m^3$)	Peger Road Winter 2008/2009	Low $PM_{2.5}$ Mass ($\mu g/m^3$)
3/17/09	4.4**	2/6/09	*
3/20/09	*		
3/23/09	4.7**		
3/26/09	3.8**		

*No, incomplete, or invalid CMB data set.
**Mass was too small to conduct a CMB analysis.
Note that 2/21/09 had a low mass (6.2 $\mu g/m^3$) and poor fit for OMNI RAMS CMB.

State Building Winter 2009/2010 EPA Runs	Low $PM_{2.5}$ Mass ($\mu g/m^3$)	State Building Winter 2009/2010 OMNI Runs	Low $PM_{2.5}$ Mass ($\mu g/m^3$)	North Pole Winter 2009/2010	Low $PM_{2.5}$ Mass ($\mu g/m^3$)
11/9/09	*	11/9/09	*	11/19/09	*
11/12/09	4.0**	11/12/09	4.0**	1/14/10	4.5**
11/18/09	4.9**	11/18/09	4.9**	1/29/10	3.3**
12/3/09	*	12/3/09	*	2/1/10	*
12/6/09	0.4**	12/6/09	0.4**	2/19/10	*
12/15/09	4.1**	12/9/09	*	2/25/10	3.8**
12/18/09	3.6**	12/12/09	*	3/6/10	*
2/25/10	3.1**	12/15/09	4.1**	3/9/10	4.1**
3/6/10	3.8**	12/18/09	3.6**		
3/9/10	3.4**	12/30/2009	*		
		1/2/2010	*		
		1/5/2010	*		
		1/20/10	*		
		1/26/10	*		
		2/4/10	*		
		2/25/10	3.1**		
		3/6/10	3.8**		
		3/9/10	3.4**		
		3/12/10	*		

*No, incomplete, or invalid CMB data set.
**Mass was too small to conduct a CMB analysis.

RAMS Winter 2009/2010	Low $PM_{2.5}$ Mass ($\mu g/m^3$)	Peger Road Winter 2009/2010	Low $PM_{2.5}$ Mass ($\mu g/m^3$)
11/17/09	*	11/18/09	*
11/18/09	*	11/19/09	*
11/19/09	*	2/25/10	*
1/26/10	*	3/9/10	3.6**
1/29/10	*		

*No, incomplete, or invalid CMB data set.
**Mass was too small to conduct a CMB analysis.
Note that 2/22/10 gave a poor fit for OMNI Peger Road CMB.

State Building Winter 2010/2011	Low $PM_{2.5}$ Mass ($\mu g/m^3$)	North Pole Winter 2010/2011
11/4/10	3.3**	None.
11/25/10	*	
12/16/10	*	
12/19/10	*	
12/22/10	*	
12/25/10	*	
12/28/10	*	
12/31/10	*	
1/3/11	*	
1/6/11	*	
1/9/11	*	
1/12/11	*	
1/15/11	*	
1/18/11	*	
1/21/11	*	
1/24/11	*	
1/27/11	*	
1/30/11	*	
2/2/11	*	

*No, incomplete, or invalid CMB data set.
**Mass was too small to conduct a CMB analysis.

Peger Road Winter 2010/2011
None.

State Building Winter 2011/2012	Low $PM_{2.5}$ Mass ($\mu g/m^3$)	North Pole Winter 2011/2012	Low $PM_{2.5}$ Mass ($\mu g/m^3$)
11/5/11	*	11/2/11	***
11/20/11	*	12/5/11	2.5**
12/5/11	*	12/23/11	5.6**
12/11/11	*	1/22/12	***
12/23/11	6.3**	1/25/12	***
1/1/12	*	2/3/12	***
1/22/12	*	2/9/12	***
2/3/12	6.5**	2/12/12	***
2/24/12	5.0**	2/24/12	3.5**
2/27/12	4.3**	2/27/12	2.1**
3/4/12	*	3/1/12	5.1**
3/7/12	*	3/7/12	4.1**
3/31/12	5.4**	3/13/12	4.3**
		3/16/12	5.5**

*No, incomplete, or invalid CMB data set.
**Mass was too small to conduct a CMB analysis.
***Could not get a good statistical fit for CMB analysis.
Note that 1/28/12 and 1/31/12 (State Building) provided poor statistical fits for the OMNI CMB.
Note that 1/28/12 and 1/31/12 (State Building) provided poor statistical fits for the OMNI CMB, while the 1/28/12 date also provided a poor fit for the 1/28/12 North Pole CMB run.

RAMS Winter 2011/2012	Low $PM_{2.5}$ Mass ($\mu g/m^3$)	NCORE Winter 2011/2012	Low $PM_{2.5}$ Mass ($\mu g/m^3$)	NPF3 Winter 2011/2012	Low $PM_{2.5}$ Mass ($\mu g/m^3$)
1/13/12	***	12/5/11	5.1**	3/1/12	4.5**
1/19/12	3.1**	12/23/11	5.6**	3/13/12	5.1**
1/22/12	0.8**	1/22/12	3.3**	3/28/12	5.2**
1/25/12	0.7**	2/24/12	5.7**	3/31/12	4.8**
1/28/12	2.8**	2/27/12	3.6**		
2/3/12	5.6**	3/25/12	***		
2/24/12	5.9**	3/31/12	5.6**		
2/27/12	3.5**				

*No, incomplete, or invalid CMB data set.
**Mass was too small to conduct a CMB analysis.
***Could not get a good statistical fit for CMB analysis.
Note that 1/16/12 (RAMS) and 2/6/12 and 2/9/12 (NCORE) provided poor statistical fits for the OMNI CMB.

State Building Summer 2012	Low $PM_{2.5}$ Mass ($\mu g/m^3$)	NCORE Sumer 2012	Low $PM_{2.5}$ Mass ($\mu g/m^3$)
6/2/12	***	6/26/12	***
7/2/12	***	7/5/12	***
7/8/12	***	7/8/12	***
7/14/12	***	7/11/12	***
7/17/12	*	7/14/12	***
7/23/12	***	7/17/12	***
8/4/12	***	7/23/12	***
8/16/12	***	8/25/12	*
8/22/12	***	8/28/12	***
8/28/12	***	8/31/12	***
8/31/12	***		

*No, incomplete, or invalid CMB data set.
**Mass was too small to conduct a CMB analysis.
***Could not get a good statistical fit for CMB analysis.

State Building Winter 2012/2013	Low $PM_{2.5}$ Mass ($\mu g/m^3$)	NPE Winter 2012/2013	Low $PM_{2.5}$ Mass ($\mu g/m^3$)
11/17/12	3.3**	11/23/12	5.3**
11/29/12	*	12/11/12	5.5**
12/5/12	***	1/19/13	5.8**
12/11/12	5.8**	1/22/13	4.4**
12/17/12	***	2/21/13	3.4**
12/20/12	***	3/5/13	*
12/23/12	***	3/14/13	2.6**
12/26/12	***	3/20/13	1.0**
1/10/13	***	3/23/13	4.6**
1/13/13	***		
1/16/13	*		
1/25/13	***		
1/31/13	***		
2/9/13	*		
2/15/13	***		
2/21/13	3.8**		
3/5/13	*		
3/14/13	*		
3/20/13	*		
3/23/13	*		
3/26/13	4.8**		

*No, incomplete, or invalid CMB data set.
**Mass was too small to conduct a CMB analysis.
***Could not get a good statistical fit for CMB analysis.
Note that 12/26/12 (NPE) provided poor statistical fits for the OMNI CMB.

NCORE Winter 2012/2013	Low $PM_{2.5}$ Mass ($\mu g/m^3$)	NPF3 Winter 2012/2013	Low $PM_{2.5}$ Mass ($\mu g/m^3$)
11/2/12	*	11/2/12	*
11/5/12	*	12/5/12	*
11/17/12	3.7**	12/8/12	*
11/26/12	*	1/22/13	4.2**
12/11/12	5.8**	2/15/13	*
1/7/13	*	2/18/13	*
1/31/13	***	2/21/13	4.0**
2/15/13	3.8**	3/14/13	3.2**
2/21/13	*		
3/14/13	3.5**		
3/23/13	5.0**		
3/26/13	5.0**		

*No, incomplete, or invalid CMB data set.
**Mass was too small to conduct a CMB analysis.
***Could not get a good statistical fit for CMB analysis.

Appendix C. CMB Results for Each Sample Day.

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – EPA Profiles. State Building – Winter 2005/2006.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	Autos	Autos STD ERR	Diesel	Diesel STD ERR	Wood Smoke	Wood Smoke STD ERR
11/3/05	17.8	3.9	0.4	1.6	0.5	0.0	0.0	0.0	0.0	13.2	1.4
11/6/05	12.8	2.2	0.2	1.7	0.3	0.0	0.0	0.0	0.0	8.9	1.1
11/9/05	*	*	*	*	*	*	*	*	*	*	*
11/12/05	20.8	3.8	0.6	1.3	0.5	6.6	2.5	0.0	0.0	7.7	2.2
11/15/05	30.5	6.4	1.0	2.6	0.8	0.0	0.0	5.0	1.9	15.4	2.5
11/18/05	4.3**	**	**	**	**	**	**	**	**	**	**
11/21/05	9.1	1.9	0.2	1.3	0.3	0.0	0.0	0.0	0.0	6.3	0.8
11/24/05	*	*	*	*	*	*	*	*	*	*	*
11/27/05	26.4	4.8	0.8	2.1	0.7	0.0	0.0	3.2	1.2	14.5	2.2
11/30/05	21.7	3.7	0.6	4.6	0.7	0.0	0.0	2.4	1.0	9.9	1.6
12/3/05	*	*	*	*	*	*	*	*	*	*	*
12/6/05	17.1	2.9	0.3	2.0	0.6	0.0	0.0	3.4	1.0	9.2	1.5
12/9/05	16.1	2.7	0.3	0.0	0.0	0.0	0.0	4.4	1.0	8.4	1.5
12/13/05	*	*	*	*	*	*	*	*	*	*	*
12/15/05	25.1	5.0	0.6	1.9	0.9	0.0	0.0	4.9	1.4	12.9	2.1
12/18/05	25.8	5.2	0.8	2.2	0.8	0.0	0.0	3.6	1.3	13.8	2.2
12/21/05	25.9	4.8	0.5	1.6	0.6	0.0	0.0	6.4	1.6	12.7	2.1
12/24/05	24.4	4.2	0.5	2.2	0.5	0.0	0.0	4.4	1.4	13.2	2.0
12/27/05	*	*	*	*	*	*	*	*	*	*	*
12/30/05	34.2	7.3	0.8	3.0	0.9	0.0	0.0	0.0	0.0	25.2	3.0
1/2/06	*	*	*	*	*	*	*	*	*	*	*
1/5/06	*	*	*	*	*	*	*	*	*	*	*
1/8/06	31.4	6.1	0.7	2.7	0.8	0.0	0.0	0.0	0.0	23.8	2.2
1/11/06	*	*	*	*	*	*	*	*	*	*	*
1/14/06	18.2	3.3	0.4	1.6	0.4	0.0	0.0	0.0	0.0	12.7	1.5
1/17/06	*	*	*	*	*	*	*	*	*	*	*
1/20/06	31.1	6.5	1.0	2.3	0.8	0.0	0.0	0.0	0.0	23.9	3.1
1/23/06	26.5	5.7	0.9	1.7	0.7	9.0	4.0	0.0	0.0	12.0	2.2
1/26/06	42	12.1	1.3	2.9	1.5	0.0	0.0	0.0	0.0	27.1	3.3
1/29/06	30.7	7.5	0.8	3.6	1.0	0.0	0.0	0.0	0.0	20.0	2.4
2/1/06	7.0	1.3	0.1	1.1	0.2	0.0	0.0	0.0	0.0	5.6	0.9
2/4/06	*	*	*	*	*	*	*	*	*	*	*
2/7/06	15.3	2.9	0.5	2.0	0.6	0.0	0.0	3.3	0.9	7.1	1.3
2/10/06	7.4	1.3	0.1	0.5	0.2	0.0	0.0	0.0	0.0	5.8	0.7
2/13/06	5.9**	**	**	**	**	**	**	**	**	**	**
2/16/06	12.9	2.2	0.3	1.6	0.4	0.0	0.0	2.0	0.7	7.5	1.2
2/19/06	4.4**	**	**	**	**	**	**	**	**	**	**
2/22/06	7.1	1.6	0.2	0.6	0.2	0.0	0.0	0.0	0.0	4.4	0.7
2/25/06	15.1	3.9	0.4	1.6	0.5	0.0	0.0	0.0	0.0	9.9	2.8
2/28/06	20.1	3.4	0.4	1.4	0.4	0.0	0.0	0.0	0.0	14.2	1.7
3/3/06	23.2	5.0	0.6	3.9	0.7	0.0	0.0	5.3	1.6	8.9	1.7

3/6/06	15.1	3.6	0.4	1.7	0.5	0.0	0.0	0.0	0.0	9.6	1.2
3/9/06	7.9	2.6	0.3	0.7	0.3	0.0	0.0	0.0	0.0	4.2	0.8
3/12/06	9.4	2.8	0.3	0.7	0.4	0.0	0.0	0.0	0.0	5.5	0.9
3/15/06	8.5	2.7	0.4	1.0	0.3	0.0	0.0	0.0	0.0	4.7	0.7
3/18/06	11.3	2.5	0.4	1.1	0.3	0.0	0.0	0.0	0.0	7.0	1.0
3/21/06	9.4	2.2	0.4	1.3	0.3	0.0	0.0	0.0	0.0	5.8	0.9
3/24/06	4.8**	**	**	**	**	**	**	**	**	**	**
3/27/06	10.6	2.1	0.3	1.4	0.3	0.0	0.0	0.0	0.0	7.1	1.9
3/30/06	13.7	2.8	0.3	1.6	0.4	0.0	0.0	0.0	0.0	9.6	2.6
Average	**18.9**	**4.0**	**0.5**	**1.8**	**0.5**	**0.4**	**0.2**	**1.3**	**0.4**	**11.3**	**1.7**

Notes: *No or incomplete CMB data set. **Mass was too small to conduct a CMB analysis.

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – OMNI Profiles. State Building – Winter 2005/2006.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	No. 2 Fuel Oil	No. 2 Fuel Oil STD ERR	Diesel	Diesel STD ERR	Wood Smoke	Wood Smoke STD ERR
11/3/05	17.8	3.9	0.4	1.5	0.5	0.0	0.0	0.0	0.0	13.8	1.3
11/6/05	12.8	1.2	0.2	1.3	0.2	5.2	1.0	0.0	0.0	5.0	1.1
11/9/05	*	*	*	*	*	*	*	*	*	*	*
11/12/05	20.8	2.2	0.6	0.9	0.3	8.5	1.7	0.0	0.0	7.6	1.7
11/15/05	30.5	3.3	1.0	1.5	0.5	16.6	2.6	0.0	0.0	7.7	2.3
11/18/05	4.3**	**	**	**	**	**	**	**	**	**	**
11/21/05	9.1	1.8	0.2	1.2	0.2	0.0	0.0	0.0	0.0	6.5	0.7
11/24/05	*	*	*	*	*	*	*	*	*	*	*
11/27/05	26.4	2.4	0.7	1.2	0.3	12.9	2.0	0.0	0.0	8.8	1.9
11/30/05	21.7	2.1	0.6	3.9	0.5	8.7	2.0	0.0	0.0	6.4	1.7
12/3/05	*	*	*	*	*	*	*	*	*	*	*
12/6/05	17.1	1.9	0.4	1.5	0.4	5.3	1.9	1.5	0.8	6.8	1.7
12/9/05	16.1	1.5	0.4	0.0	0.0	6.6	2.2	2.9	1.0	5.1	1.9
12/13/05	*	*	*	*	*	*	*	*	*	*	*
12/15/05	25.1	2.8	0.6	1.1	0.4	10.9	2.2	2.5	1.0	7.7	2.1
12/18/05	25.8	2.8	0.8	1.3	0.4	13.3	2.2	0.0	0.0	8.0	2.1
12/21/05	25.9	2.8	0.5	0.8	0.4	11.0	2.2	3.5	1.5	7.1	2.2
12/24/05	24.4	2.4	0.5	1.5	0.4	9.5	1.9	0.0	0.0	10.0	1.8
12/27/05	*	*	*	*	*	*	*	*	*	*	*
12/30/05	34.2	4.3	0.8	2.0	0.6	15.5	3.4	2.7	1.2	5.7	2.8
1/2/06	*	*	*	*	*	*	*	*	*	*	*
1/5/06	*	*	*	*	*	*	*	*	*	*	*
1/8/06	31.4	3.3	0.6	1.6	0.5	15.2	2.7	0.0	0.0	6.8	2.3
1/11/06	*	*	*	*	*	*	*	*	*	*	*
1/14/06	18.2	1.8	0.4	1.0	0.3	8.1	1.5	0.0	0.0	6.6	1.5
1/17/06	*	*	*	*	*	*	*	*	*	*	*
1/20/06	31.1	3.0	1.0	1.1	0.4	18.6	2.5	0.0	0.0	9.1	2.4
1/23/06	26.5	2.4	0.8	1.3	0.4	17.9	2.2	0.0	0.0	3.4	2.0
1/26/06	42	7.9	1.4	1.2	1.1	22.9	5.9	0.0	0.0	9.1	4.5
1/29/06	30.7	4.4	0.8	2.5	0.6	16.6	3.4	0.0	0.0	7.5	2.9
2/1/06	7.0	0.8	0.2	0.9	0.1	2.7	0.6	0.0	0.0	3.9	0.8
2/4/06	*	*	*	*	*	*	*	*	*	*	*
2/7/06	15.3	1.9	0.6	1.5	0.4	6.0	2.2	2.3	0.8	4.0	1.8
2/10/06	7.4	0.8	0.2	0.3	0.1	2.7	0.6	0.0	0.0	4.2	0.8
2/13/06	5.9**	**	**	**	**	**	**	**	**	**	**
2/16/06	12.9	1.5	0.3	1.3	0.2	4.5	1.2	0.0	0.0	6.2	1.2
2/19/06	4.4**	**	**	**	**	**	**	**	**	**	**
2/22/06	7.1	1.0	0.2	0.4	0.1	3.0	0.8	0.0	0.0	2.1	0.8
2/25/06	15.1	2.3	0.4	1.0	0.3	8.4	1.8	0.0	0.0	2.6	1.6
2/28/06	20.1	3.3	0.4	1.4	0.4	0.0	0.0	0.0	0.0	13.8	1.5
3/3/06	23.2	2.9	0.6	3.0	0.5	11.7	2.4	0.0	0.0	5.0	2.1
3/6/06	15.1	3.5	0.4	1.7	0.5	0.0	0.0	0.0	0.0	10.4	1.3
3/9/06	7.9	1.6	0.2	0.4	0.2	5.6	0.7	0.0	0.0	0.0	0.0
3/12/06	9.4	1.6	0.3	0.3	0.2	7.0	0.7	0.0	0.0	0.0	0.0

3/15/06	8.5	1.4	0.4	0.5	0.2	7.1	0.7	0.0	0.0	0.0	0.0
3/18/06	11.3	1.0	0.3	0.5	0.1	8.3	0.7	0.0	0.0	0.0	0.0
3/21/06	9.4	2.2	0.4	1.3	0.3	0.0	0.0	0.0	0.0	6.3	1.0
3/24/06	4.8**	**	**	**	**	**	**	**	**	**	**
3/27/06	10.6	1.3	0.3	1.1	0.2	4.0	1.0	0.0	0.0	3.3	1.0
3/30/06	13.7	1.5	0.3	1.1	0.2	7.1	1.2	0.0	0.0	3.1	1.2
Average	**18.9**	**2.4**	**0.5**	**1.3**	**0.3**	**8.4**	**1.6**	**0.4**	**0.2**	**5.9**	**1.6**

Notes: *No or incomplete CMB data set. **Mass was too small to conduct a CMB analysis.

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – EPA Profiles. State Building – Winter 2006/2007.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	Autos	Autos STD ERR	Diesel	Diesel STD ERR	Wood Smoke	Wood Smoke STD ERR
11/1/06	5.7**	**	**	**	**	**	**	**	**	**	**
11/4/06	27.9	4.5	0.6	2.3	0.6	0.0	0.0	0.0	0.0	22.4	2.6
11/7/06	13.5	1.8	0.2	1.2	0.2	3.6	1.7	0.0	0.0	6.1	1.5
11/10/06	21.3	3.1	0.4	1.6	0.4	0.0	0.0	3.3	1.2	12.1	1.9
11/13/06	*	*	*	*	*	*	*	*	*	*	*
11/16/06	*	*	*	*	*	*	*	*	*	*	*
11/19/06	25.8	6.2	0.8	1.9	0.8	0.0	0.0	0.0	0.0	16.1	2.0
11/22/06	12.7	1.8	0.2	1.5	0.3	0.0	0.0	1.4	0.6	8.5	1.3
11/25/06	32.1	6.2	0.8	2.0	0.8	0.0	0.0	0.0	0.0	23.0	5.9
11/28/06	25.7	5.2	0.6	2.2	0.8	0.0	0.0	3.5	1.3	13.5	2.1
12/1/06	8.0	1.7	0.2	0.9	0.2	0.0	0.0	0.0	0.0	5.8	0.8
12/4/06	15.5	2.3	0.3	2.5	0.5	0.0	0.0	2.5	0.8	8.3	1.4
12/7/06	35.1	3.9	0.5	1.7	0.5	15.2	3.4	0.0	0.0	10.2	2.0
12/10/06	16.3	2.7	0.3	1.3	0.5	0.0	0.0	2.8	0.9	9.5	1.5
12/13/06	15.1	2.6	0.3	1.3	0.3	4.8	2.0	0.0	0.0	5.4	1.7
12/16/06	*	*	*	*	*	*	*	*	*	*	*
12/19/06	*	*	*	*	*	*	*	*	*	*	*
12/22/06	26.0	6.9	0.9	2.1	1.0	0.0	0.0	3.4	1.6	13.4	2.2
12/25/06	*	*	*	*	*	*	*	*	*	*	*
12/28/06	23.8	3.8	0.5	1.5	0.7	0.0	0.0	3.6	1.1	13.5	2.0
12/31/06	16.9	4.1	0.5	1.4	0.6	0.0	0.0	2.0	0.9	10.7	1.7
1/3/07	11.0	2.1	0.3	1.3	0.3	0.0	0.0	0.0	0.0	7.1	1.0
1/6/07	19.8	3.5	0.4	1.2	0.5	5.8	2.8	0.0	0.0	10.0	1.8
1/9/07	*	*	*	*	*	*	*	*	*	*	*
1/12/07	30.4	5.3	0.7	3.1	0.7	0.0	0.0	5.2	1.7	15.7	2.4
1/15/07	16.3	2.2	0.3	0.9	0.3	0.0	0.0	0.0	0.0	13.1	2.8
1/18/07	*	*	*	*	*	*	*	*	*	*	*
1/21/07	23.8	4.4	0.5	2.2	0.6	0.0	0.0	3.7	1.5	12.1	1.9
1/24/07	17.4	3.7	0.5	1.8	0.5	0.0	0.0	2.8	1.3	8.5	1.5
1/27/07	31.6	5.9	0.7	2.8	0.8	6.9	3.4	0.0	0.0	14.5	3.3
1/30/07	25.0	3.9	0.5	2.0	0.5	0.0	0.0	7.7	1.5	10.2	1.8
2/2/07	*	*	*	*	*	*	*	*	*	*	*
2/5/07	34.6	5.3	0.7	3.3	0.7	8.4	3.8	0.0	0.0	18.3	2.9
2/8/07	14.8	3.0	0.4	0.8	0.4	0.0	0.0	0.0	0.0	11.1	1.3
2/11/07	14.6	2.0	0.2	1.1	0.3	0.0	0.0	0.0	0.0	10.2	1.4
2/14/07	18.0	3.3	0.4	1.7	0.6	0.0	0.0	3.4	1.0	10.0	1.5
2/17/07	21.5	4.1	0.5	1.6	0.5	0.0	0.0	2.1	1.0	13.7	2.0
2/20/07	*	*	*	*	*	*	*	*	*	*	*
2/23/07	38.7	8.4	1.0	3.2	1.1	0.0	0.0	0.0	0.0	27.0	5.9
2/26/07	15.1	3.3	0.4	1.1	0.4	0.0	0.0	0.0	0.0	10.5	2.9
3/1/07	*	*	*	*	*	*	*	*	*	*	*
3/4/07	18.8	4.1	0.5	2.0	0.6	0.0	0.0	0.0	0.0	12.8	1.5
3/7/07	*	*	*	*	*	*	*	*	*	*	*
3/10/07	10.6	2.4	0.3	0.7	0.3	0.0	0.0	0.0	0.0	7.8	1.1
3/13/07	14.6	3.7	0.4	1.0	0.5	0.0	0.0	0.0	0.0	9.5	2.6

3/16/07	13.7	3.0	0.4	0.9	0.4	0.0	0.0	0.0	0.0	10.3	2.7
3/19/07	14.3	2.9	0.4	1.5	0.5	0.0	0.0	2.9	0.9	7.2	1.3
3/22/07	7.2	1.3	0.2	0.4	0.2	0.0	0.0	0.0	0.0	5.4	0.9
3/25/07	15.8	3.4	0.4	1.5	0.4	0.0	0.0	2.7	1.2	7.4	1.3
3/28/07	18.2	3.6	0.4	2.3	0.5	0.0	0.0	3.4	1.3	8.0	1.4
3/31/07	14.0	2.6	0.3	1.6	0.3	0.0	0.0	2.4	1.0	7.6	1.3
Average	**19.9**	**3.7**	**0.5**	**1.7**	**0.5**	**1.1**	**0.4**	**1.5**	**0.5**	**11.5**	**2.0**

Notes: *No, incomplete, or invalid CMB data set. **Mass was too small to conduct a CMB analysis.

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – OMNI Profiles. State Building – Winter 2006/2007.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	Autos	Autos STD ERR	No. 2 Fuel Oil	No. 2 Fuel Oil STD ERR	Diesel	Diesel STD ERR	Wood Smoke	Wood Smoke STD ERR
11/1/06	5.7**	**	**	**	**	**	**	**	**	**	**	**	**
11/4/06	27.9	2.5	0.5	1.6	0.4	**0.0**	**0.0**	10.0	1.9	**0.0**	**0.0**	14.3	3.0
11/7/06	13.5	0.9	0.2	0.9	0.1	**0.0**	**0.0**	4.5	0.7	**0.0**	**0.0**	8.0	1.4
11/10/06	21.3	1.9	0.4	1.1	0.3	**0.0**	**0.0**	6.7	1.5	**0.0**	**0.0**	9.8	1.6
11/13/06	*	*	*	*	*	*	*	*	*	*	*	*	*
11/16/06	*	*	*	*	*	*	*	*	*	*	*	*	*
11/19/06	25.8	3.3	0.7	0.9	0.5	**0.0**	**0.0**	15.1	2.6	**0.0**	**0.0**	7.3	3.5
11/22/06	12.7	1.0	0.2	1.4	0.2	**0.0**	**0.0**	4.3	0.9	**0.0**	**0.0**	6.8	1.1
11/25/06	32.1	3.1	0.7	0.9	0.4	**0.0**	**0.0**	16.3	2.5	**0.0**	**0.0**	14.1	3.7
11/28/06	25.7	3.1	0.6	1.4	0.4	**0.0**	**0.0**	11.4	2.4	**0.0**	**0.0**	9.2	2.1
12/1/06	8.0	1.0	0.2	0.6	0.1	**0.0**	**0.0**	3.5	0.8	**0.0**	**0.0**	3.8	0.9
12/4/06	15.5	1.2	0.3	2.1	0.2	**0.0**	**0.0**	5.8	1.2	1.5	0.7	5.7	1.3
12/7/06	35.1	2.2	0.5	1.1	0.3	11.6	3.0	8.8	1.7	**0.0**	**0.0**	8.6	3.0
12/10/06	16.3	1.5	0.3	0.8	0.2	**0.0**	**0.0**	6.1	1.2	**0.0**	**0.0**	7.9	1.3
12/13/06	15.1	1.4	0.3	1.0	0.2	**0.0**	**0.0**	6.5	1.1	**0.0**	**0.0**	7.0	1.7
12/16/06	*	*	*	*	*	*	*	*	*	*	*	*	*
12/19/06	*	*	*	*	*	*	*	*	*	*	*	*	*
12/22/06	26.0	3.9	0.8	0.9	0.5	**0.0**	**0.0**	16.8	3.0	**0.0**	**0.0**	5.0	2.5
12/25/06	*	*	*	*	*	*	*	*	*	*	*	*	*
12/28/06	23.8	2.1	0.4	0.9	0.3	**0.0**	**0.0**	9.0	1.7	**0.0**	**0.0**	10.5	1.7
12/31/06	16.9	2.7	0.5	0.8	0.4	**0.0**	**0.0**	7.9	2.0	**0.0**	**0.0**	7.2	1.8
1/3/07	11.0	1.3	0.3	1.0	0.2	**0.0**	**0.0**	4.2	1.0	**0.0**	**0.0**	4.0	1.1
1/6/07	19.8	1.8	0.4	1.0	0.3	**0.0**	**0.0**	9.1	1.4	**0.0**	**0.0**	9.3	2.3
1/9/07	*	*	*	*	*	*	*	*	*	*	*	*	*
1/12/07	30.4	3.0	0.6	2.2	0.5	**0.0**	**0.0**	12.1	2.4	**0.0**	**0.0**	11.7	2.2
1/15/07	16.3	1.1	0.2	0.7	0.2	**0.0**	**0.0**	5.9	0.9	**0.0**	**0.0**	9.1	1.6
1/18/07	*	*	*	*	*	*	*	*	*	*	*	*	*
1/21/07	23.8	2.4	0.5	1.4	0.3	**0.0**	**0.0**	10.7	1.9	**0.0**	**0.0**	8.1	1.8
1/24/07	17.4	2.1	0.4	1.3	0.3	**0.0**	**0.0**	8.3	1.7	**0.0**	**0.0**	5.1	1.6
1/27/07	31.6	3.2	0.7	1.9	0.5	**0.0**	**0.0**	14.9	2.7	**0.0**	**0.0**	9.6	2.4
1/30/07	25.0	2.0	0.6	1.3	0.6	**0.0**	**0.0**	9.3	2.6	3.6	1.1	10.0	3.1
2/2/07	*	*	*	*	*	*	*	*	*	*	*	*	*
2/5/07	34.6	2.2	0.6	2.8	0.4	**0.0**	**0.0**	16.5	2.1	**0.0**	**0.0**	15.2	3.3
2/8/07	14.8	1.5	0.4	0.6	0.2	**0.0**	**0.0**	7.6	1.2	**0.0**	**0.0**	5.2	1.3
2/11/07	14.6	1.0	0.2	0.7	0.1	**0.0**	**0.0**	5.7	0.9	**0.0**	**0.0**	6.1	1.1
2/14/07	18.0	1.9	0.5	1.1	0.4	**0.0**	**0.0**	7.6	2.3	2.3	0.8	5.1	1.9
2/17/07	21.5	2.6	0.5	0.9	0.4	**0.0**	**0.0**	9.6	2.0	**0.0**	**0.0**	8.4	1.9
2/20/07	*	*	*	*	*	*	*	*	*	*	*	*	*
2/23/07	38.7	4.6	0.9	1.8	0.6	**0.0**	**0.0**	20.9	3.4	**0.0**	**0.0**	11.5	4.4
2/26/07	15.1	1.7	0.4	0.9	0.2	**0.0**	**0.0**	8.5	1.4	**0.0**	**0.0**	4.1	1.9
3/1/07	*	*	*	*	*	*	*	*	*	*	*	*	*
3/4/07	18.8	2.5	0.5	1.8	0.4	**0.0**	**0.0**	8.7	2.0	**0.0**	**0.0**	6.1	1.7
3/7/07	*	*	*	*	*	*	*	*	*	*	*	*	*

3/10/07	10.6	1.5	0.3	0.3	0.2	**0.0**	**0.0**	4.9	1.1	**0.0**	**0.0**	3.5	1.6
3/13/07	14.6	1.8	0.4	0.8	0.2	**0.0**	**0.0**	10.5	0.9	**0.0**	**0.0**	**0.0**	**0.0**
3/16/07	13.7	1.7	0.4	0.8	0.2	**0.0**	**0.0**	6.9	1.4	**0.0**	**0.0**	4.0	1.3
3/19/07	14.3	1.6	0.3	0.9	0.2	**0.0**	**0.0**	7.4	1.3	**0.0**	**0.0**	4.4	1.2
3/22/07	7.2	0.7	0.2	0.3	0.1	**0.0**	**0.0**	2.8	0.6	**0.0**	**0.0**	2.9	1.0
3/25/07	15.8	1.9	0.4	0.9	0.3	**0.0**	**0.0**	8.0	1.5	**0.0**	**0.0**	5.8	2.1
3/28/07	18.2	1.6	0.4	1.6	0.3	**0.0**	**0.0**	10.4	1.5	**0.0**	**0.0**	4.9	2.1
3/31/07	14.0	1.4	0.3	1.1	0.2	**0.0**	**0.0**	6.5	1.2	**0.0**	**0.0**	5.0	1.2
Average	**19.9**	**2.0**	**0.4**	**1.1**	**0.3**	**0.3**	**0.1**	**9.0**	**1.7**	**0.2**	**0.1**	**7.3**	**1.9**

Notes: *No, incomplete, or invalid CMB data set. **Mass was too small to conduct a CMB analysis.

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – EPA Profiles. State Building – Winter 2007/2008.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	Autos	Autos STD ERR	Diesel	Diesel STD ERR	Wood Smoke	Wood Smoke STD ERR
11/2/07	11.0	1.5	0.2	0.8	0.2	0.0	0.0	0.0	0.0	9.4	1.0
11/5/07	23.5	3.2	0.4	1.3	0.4	0.0	0.0	0.0	0.0	19.4	1.8
11/8/07	13.1	1.9	0.2	0.6	0.3	0.0	0.0	4.4	1.0	6.0	1.1
11/11/07	23.8	3.8	0.5	2.2	0.5	0.0	0.0	5.5	1.4	11.7	1.9
11/14/07	*	*	*	*	*	*	*	*	*	*	*
11/17/07	9.1	0.7	0.2	1.5	0.3	1.7	0.8	0.0	0.0	5.2	1.1
11/20/07	18.4	2.4	0.3	0.6	0.3	0.0	0.0	3.8	0.9	11.8	1.7
11/23/07	11.7	1.3	0.2	0.6	0.2	0.0	0.0	2.3	0.7	7.4	1.1
11/26/07	12.7	1.8	0.2	0.6	0.2	0.0	0.0	3.9	1.0	6.0	1.1
11/29/07	29.3	5.0	0.6	2.0	0.6	11.6	3.1	0.0	0.0	9.7	2.8
12/2/07	5.4**	**	**	**	**	**	**	**	**	**	**
12/5/07	24.2	3.1	0.4	1.3	0.4	9.7	2.8	0.0	0.0	10.1	1.8
12/8/07	17.7	2.9	0.4	1.7	0.6	0.0	0.0	3.3	1.0	9.3	1.5
12/11/07	11.8	1.7	0.2	1.0	0.4	0.0	0.0	2.2	0.7	6.8	1.1
12/14/07	4.0**	**	**	**	**	**	**	**	**	**	**
12/17/07	25.6	4.5	0.6	1.8	0.7	0.0	0.0	2.9	1.2	16.5	2.4
12/20/07	*	*	*	*	*	*	*	*	*	*	*
12/23/07	32.5	6.3	0.8	2.4	1.2	0.0	0.0	6.7	1.6	18.0	2.8
12/26/07	13.0	3.0	0.4	1.5	0.4	0.0	0.0	1.5	0.7	7.0	1.2
12/29/07	16.4	2.7	0.3	1.8	0.6	0.0	0.0	4.1	0.9	7.9	1.4
1/1/08	24.4	5.0	0.6	1.3	0.7	7.3	3.6	0.0	0.0	10.2	1.9
1/4/08	10.2	1.4	0.2	1.3	0.3	0.0	0.0	1.2	0.6	6.9	1.1
1/7/08	20.8	4.2	0.5	1.7	0.7	0.0	0.0	3.4	1.1	11.2	1.7
1/10/08	7.3	1.5	0.2	0.6	0.2	0.0	0.0	0.0	0.0	5.2	0.7
1/13/08	8.4	1.4	0.2	0.5	0.2	0.0	0.0	0.0	0.0	6.3	0.8
1/16/08	25.1	3.9	0.5	1.9	0.5	7.5	3.1	0.0	0.0	12.4	2.1
1/19/08	26.4	4.4	0.5	2.6	0.6	0.0	0.0	5.6	1.5	13.2	2.1
1/22/08	7.8	1.4	0.2	0.5	0.3	0.0	0.0	1.6	0.6	4.6	0.8
1/25/08	18.2	4.4	0.5	1.5	0.7	0.0	0.0	2.8	1.1	9.5	1.6
1/28/08	24.4	4.3	0.5	1.4	0.5	8.3	2.7	0.0	0.0	8.5	2.4
1/31/08	26.2	4.6	0.6	2.6	0.6	0.0	0.0	0.0	0.0	19.0	1.8
2/3/08	24.2	4.6	0.6	2.1	0.6	0.0	0.0	0.0	0.0	16.5	1.9
2/6/08	68.0	17.1	2.1	5.0	2.2	0.0	0.0	0.0	0.0	48.3	6.0
2/9/08	43.7	11.1	1.4	3.5	1.4	0.0	0.0	0.0	0.0	27.4	3.7
2/12/08	9.5	2.1	0.3	0.8	0.3	0.0	0.0	0.0	0.0	7.3	1.1
2/15/08	8.7	1.8	0.2	0.6	0.2	0.0	0.0	0.0	0.0	6.1	0.9
2/18/08	14.9	2.0	0.3	1.2	0.5	0.0	0.0	3.6	0.9	8.3	1.4
2/21/08	7.5	1.1	0.1	0.8	0.2	0.0	0.0	0.0	0.0	6.2	0.8
2/24/08	*	*	*	*	*	*	*	*	*	*	*
2/27/08	17.2	3.1	0.4	1.2	0.5	0.0	0.0	2.2	0.8	11.3	1.7
3/1/08	5.2**	**	**	**	**	**	**	**	**	**	**
3/4/08	24.7	3.1	0.4	2.7	0.4	0.0	0.0	6.3	1.3	12.4	1.9
3/7/08	5.8**	**	**	**	**	**	**	**	**	**	**
3/10/08	*	*	*	*	*	*	*	*	*	*	*

3/13/08	11.0	2.1	0.3	2.0	0.3	0.0	0.0	0.0	0.0	7.1	0.9
3/16/08	*	*	*	*	*	*	*	*	*	*	*
3/19/08	6.6	1.3	0.2	0.6	0.2	0.0	0.0	0.0	0.0	4.5	0.7
3/22/08	10.1	2.3	0.3	1.0	0.3	0.0	0.0	0.0	0.0	6.4	0.9
3/25/08	5.7**	**	**	**	**	**	**	**	**	**	**
3/28/08	8.5	1.4	0.2	1.2	0.2	0.0	0.0	0.0	0.0	6.0	0.8
3/31/08	5.7**	**	**	**	**	**	**	**	**	**	**
Average	**18.7**	**3.4**	**0.4**	**1.5**	**0.5**	**1.2**	**0.4**	**1.7**	**0.5**	**10.9**	**1.6**

Notes: *No, incomplete, or invalid CMB data set. **Mass was too small to conduct a CMB analysis.

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – OMNI Profiles. State Building – Winter 2007/2008.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	Autos	Autos STD ERR	No. 2 Fuel Oil	No. 2 Fuel Oil STD ERR	Diesel	Diesel STD ERR	Wood Smoke	Wood Smoke STD ERR
11/2/07	11.0	0.8	0.2	0.8	0.1	0.0	0.0	3.2	0.7	0.0	0.0	7.8	1.0
11/5/07	23.5	1.2	0.4	1.1	0.3	0.0	0.0	9.8	1.8	2.1	1.0	10.6	2.3
11/8/07	13.1	1.0	0.2	0.5	0.1	0.0	0.0	4.5	0.8	2.4	1.2	4.3	1.3
11/11/07	23.8	2.2	0.5	1.6	0.3	0.0	0.0	8.9	1.8	2.9	1.3	7.4	1.9
11/14/07	*	*	*	*	*	*	*	*	*	*	*	*	*
11/17/07	9.1	0.4	0.1	1.3	0.1	0.0	0.0	2.2	0.4	1.1	0.5	4.5	0.9
11/20/07	18.4	1.3	0.3	0.4	0.2	0.0	0.0	6.7	1.1	2.0	0.8	8.3	1.4
11/23/07	11.7	0.9	0.2	0.5	0.1	5.2	2.2	3.2	0.7	0.0	0.0	1.8	0.4
11/26/07	12.7	0.9	0.2	0.5	0.1	0.0	0.0	4.6	0.8	2.6	1.0	3.7	1.1
11/29/07	29.3	2.6	0.6	1.3	0.4	0.0	0.0	12.9	2.2	3.1	1.4	7.7	2.3
12/2/07	5.4**	**	**	**	**	**	**	**	**	**	**	**	**
12/5/07	24.2	1.6	0.4	1.0	0.2	0.0	0.0	7.9	1.3	2.6	1.1	10.0	2.4
12/8/07	17.7	1.8	0.4	1.2	0.3	6.3	2.6	6.7	1.4	0.0	0.0	1.8	0.6
12/11/07	11.8	1.0	0.2	0.7	0.1	0.0	0.0	3.5	0.8	0.0	0.0	6.4	1.0
12/14/07	4.0**	**	**	**	**	**	**	**	**	**	**	**	**
12/17/07	25.6	2.2	0.5	0.9	0.3	0.0	0.0	11.9	1.8	0.0	0.0	10.3	1.9
12/20/07	*	*	*	*	*	*	*	*	*	*	*	*	*
12/23/07	32.5	3.2	0.8	1.1	0.4	0.0	0.0	18.2	2.7	7.0	1.7	2.7	1.0
12/26/07	13.0	1.9	0.4	1.0	0.3	0.0	0.0	6.3	1.5	0.0	0.0	4.1	1.3
12/29/07	16.4	1.5	0.4	1.3	0.4	0.0	0.0	6.7	2.1	2.4	0.9	5.3	2.1
1/1/08	24.4	3.8	0.7	1.2	0.5	0.0	0.0	5.6	2.6	0.0	0.0	14.9	3.3
1/4/08	10.2	0.8	0.2	1.0	0.1	0.0	0.0	3.0	0.7	0.0	0.0	6.0	0.9
1/7/08	20.8	2.4	0.6	0.9	0.4	0.0	0.0	10.3	2.3	1.9	0.9	5.3	2.0
1/10/08	7.3	0.9	0.2	0.5	0.1	0.0	0.0	3.6	0.7	0.0	0.0	2.9	0.8
1/13/08	8.4	0.9	0.2	0.5	0.1	0.0	0.0	3.1	0.7	0.0	0.0	4.6	0.9
1/16/08	25.1	1.9	0.4	1.6	0.3	0.0	0.0	10.4	1.6	0.0	0.0	12.4	2.5
1/19/08	26.4	2.1	0.5	1.8	0.3	0.0	0.0	11.5	1.9	0.0	0.0	9.9	1.9
1/22/08	7.8	1.0	0.2	0.3	0.1	0.0	0.0	2.6	0.7	0.0	0.0	3.8	0.8
1/25/08	18.2	2.6	0.6	0.7	0.4	0.0	0.0	10.3	2.1	0.0	0.0	4.7	1.7
1/28/08	24.4	2.2	0.5	0.8	0.4	0.0	0.0	11.2	2.0	1.7	0.8	8.5	2.8
1/31/08	26.2	2.3	0.5	2.4	0.4	0.0	0.0	12.3	2.0	0.0	0.0	7.3	2.7
2/3/08	24.2	2.5	0.6	1.3	0.4	0.0	0.0	11.3	2.1	0.0	0.0	8.2	2.0
2/6/08	68.0	8.5	1.6	1.9	1.1	0.0	0.0	48.1	3.5	0.0	0.0	0.0	0.0
2/9/08	43.7	6.3	1.3	1.5	0.9	0.0	0.0	27.1	5.0	0.0	0.0	9.1	4.0
2/12/08	9.5	1.1	0.3	0.4	0.2	0.0	0.0	5.0	0.9	1.3	0.6	1.3	0.4
2/15/08	8.7	1.0	0.2	0.3	0.1	0.0	0.0	4.0	0.8	0.0	0.0	3.0	0.9
2/18/08	14.9	1.1	0.3	0.8	0.3	0.0	0.0	5.2	1.6	1.9	0.7	5.8	1.6
2/21/08	7.5	0.7	0.2	0.6	0.1	0.0	0.0	2.2	0.6	2.2	0.9	1.3	0.3
2/24/08	*	*	*	*	*	*	*	*	*	*	*	*	*
2/27/08	17.2	1.8	0.4	1.0	0.3	0.0	0.0	7.6	1.4	0.0	0.0	8.2	1.5
3/1/08	5.2**	**	**	**	**	**	**	**	**	**	**	**	**
3/4/08	24.7	1.7	0.4	2.1	0.3	0.0	0.0	7.8	1.5	3.6	1.3	8.8	1.8
3/7/08	5.8**	**	**	**	**	**	**	**	**	**	**	**	**
3/10/08	*	*	*	*	*	*	*	*	*	*	*	*	*

3/13/08	11.0	1.3	0.3	1.7	0.2	0.0	0.0	3.9	1.1	0.0	0.0	4.9	1.1
3/16/08	*	*	*	*	*	*	*	*	*	*	*	*	*
3/19/08	6.6	0.8	0.2	0.3	0.1	0.0	0.0	3.0	0.6	0.0	0.0	2.5	0.7
3/22/08	10.1	1.3	0.3	0.6	0.2	0.0	0.0	5.3	1.0	0.0	0.0	2.3	1.0
3/25/08	5.7**	**	**	**	**	**	**	**	**	**	**	**	**
3/28/08	8.5	0.8	0.2	1.0	0.1	0.0	0.0	2.9	0.7	0.0	0.0	3.6	0.8
3/31/08	5.7**	**	**	**	**	**	**	**	**	**	**	**	**
Average	**18.7**	**1.9**	**0.4**	**1.0**	**0.3**	**0.3**	**0.1**	**8.4**	**1.5**	**1.0**	**0.4**	**5.9**	**1.5**

Notes: *No, incomplete, or invalid CMB data set. **Mass was too small to conduct a CMB analysis.

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – EPA Profiles. State Building – Winter 2008/2009.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	Autos	Autos STD ERR	Diesel	Diesel STD ERR	Wood Smoke	Wood Smoke STD ERR
11/8/08	40.0	4.7	0.6	2.8	0.6	0.0	0.0	2.3	1.1	27.0	3.6
11/11/08	31.9	3.6	0.4	2.0	0.5	10.7	3.2	0.0	0.0	17.2	2.6
11/14/08	52.1	8.8	1.1	4.5	1.1	14.6	5.9	0.0	0.0	26.2	4.2
11/17/08	20.7	2.7	0.3	2.0	0.4	0.0	0.0	0.0	0.0	15.4	2.0
11/20/08	16.8	3.0	0.4	1.2	0.5	2.7	1.3	0.0	0.0	11.7	2.0
11/23/08	23.4	3.6	0.4	2.1	0.6	0.0	0.0	2.8	1.0	14.6	2.2
11/26/08	22.0	3.0	0.5	1.5	0.6	4.0	1.5	0.0	0.0	13.5	2.3
11/29/08	16.4	2.3	0.3	1.6	0.3	0.0	0.0	0.0	0.0	12.0	1.6
12/2/08	47.0	10.5	1.3	3.2	1.3	0.0	0.0	0.0	0.0	28.1	3.8
12/5/08	31.0	4.1	0.5	2.2	0.5	11.1	3.4	0.0	0.0	15.5	2.5
12/8/08	*	*	*	*	*	*	*	*	*	*	*
12/11/08	18.9	2.9	0.4	1.5	0.5	2.6	1.3	0.0	0.0	12.5	2.1
12/14/08	39.0	7.0	0.9	3.0	0.9	0.0	0.0	0.0	0.0	24.2	3.1
12/17/08	34.9	7.3	0.9	2.3	0.9	0.0	0.0	3.1	1.5	21.4	3.0
12/20/08	26.1	4.3	0.5	2.6	0.6	0.0	0.0	0.0	0.0	18.0	2.4
12/23/08	47.5	5.5	0.7	2.8	0.7	0.0	0.0	0.0	0.0	38.5	3.3
12/26/08	15.9	2.6	0.4	1.1	0.6	3.6	1.4	0.0	0.0	9.0	1.8
12/29/08	66.0	28.8	3.5	2.4	3.7	0.0	0.0	0.0	0.0	55.2	6.5
1/1/09	28.2	5.2	0.6	2.2	0.7	0.0	0.0	0.0	0.0	18.2	2.4
1/4/09	37.3	6.8	0.8	1.9	0.8	10.2	4.7	0.0	0.0	20.1	3.2
1/7/09	63.7	17.6	2.2	4.0	2.2	0.0	0.0	0.0	0.0	35.2	5.0
1/10/09	56.7	16.1	2.0	3.7	2.0	0.0	0.0	0.0	0.0	33.5	4.7
1/13/09	31.4	5.9	0.8	3.3	1.0	5.4	2.3	0.0	0.0	17.6	3.1
1/16/09	2.3**	**	**	**	**	**	**	**	**	**	**
1/19/09	8.2	1.7	0.2	1.4	0.2	0.0	0.0	0.0	0.0	3.9	0.7
1/22/09	6.4	1.4	0.2	0.5	0.2	0.0	0.0	0.0	0.0	5.1	0.8
1/25/09	26.7	4.3	0.5	3.7	0.6	0.0	0.0	0.0	0.0	18.2	2.4
1/28/09	31.5	8.3	1.0	2.5	1.0	0.0	0.0	0.0	0.0	20.1	2.8
1/31/09	13.4	3.0	0.4	1.3	0.4	0.0	0.0	0.0	0.0	9.1	1.3
2/3/09	18.7	4.4	0.5	1.7	0.6	0.0	0.0	0.0	0.0	13.4	1.8
2/5/09	43.1	7.2	0.8	4.6	0.9	0.0	0.0	0.0	0.0	26.9	3.2
2/6/09	*	*	*	*	*	*	*	*	*	*	*
2/7/09	32.6	6.2	0.7	3.4	0.8	0.0	0.0	0.0	0.0	22.7	2.8
2/9/09	12.3	2.0	0.2	1.3	0.3	0.0	0.0	0.0	0.0	8.5	1.2
2/12/09	18.6	2.7	0.3	2.4	0.4	0.0	0.0	1.5	0.8	12.5	1.8
2/15/09	29.6	5.3	0.7	3.4	0.7	7.6	3.8	0.0	0.0	14.6	2.4
2/18/09	23.3	4.8	0.6	1.7	0.6	0.0	0.0	0.0	0.0	16.5	4.3
2/21/09	15.6	3.0	0.4	1.2	0.4	0.0	0.0	0.0	0.0	11.7	1.6
2/24/09	19.6	3.2	0.4	2.3	0.5	4.5	2.2	0.0	0.0	9.1	2.1
2/27/09	6.9	1.6	0.2	0.6	0.2	0.0	0.0	0.0	0.0	4.7	1.4
3/2/09	15.7	2.9	0.4	1.3	0.4	4.5	2.0	0.0	0.0	6.7	1.8
3/5/09	5.7**	**	**	**	**	**	**	**	**	**	**
3/8/09	10.2	2.5	0.3	0.7	0.3	0.0	0.0	0.0	0.0	6.5	0.9
3/11/09	16.1	2.1	0.3	2.4	0.4	0.0	0.0	1.8	0.7	9.8	1.4

3/14/09	14.9	3.1	0.4	1.0	0.4	0.0	0.0	0.0	0.0	10.2	1.3
3/17/09	10.0	2.6	0.3	0.8	0.3	0.0	0.0	0.0	0.0	6.4	1.0
3/20/09	*	*	*	*	*	*	*	*	*	*	*
3/23/09	9.6	2.3	0.3	1.0	0.3	0.0	0.0	0.0	0.0	6.0	0.9
3/26/09	*	*	*	*	*	*	*	*	*	*	*
3/29/09	10.0	2.1	0.3	1.0	0.3	0.0	0.0	1.5	0.7	5.4	0.9
4/1/09	9.6	1.8	0.2	1.1	0.3	0.0	0.0	0.0	0.0	6.6	1.0
4/4/09	7.8	1.6	0.2	0.6	0.2	0.0	0.0	0.0	0.0	5.7	0.9
4/7/09	10.4	2.3	0.3	1.3	0.3	0.0	0.0	0.0	0.0	6.8	0.9
Average	**25.3**	**5.1**	**0.6**	**2.1**	**0.7**	**1.7**	**0.7**	**0.3**	**0.1**	**16.0**	**2.3**

Notes: *No or incomplete CMB data set. **Mass was too small to conduct a CMB analysis.

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – OMNI Profiles. State Building – Winter 2008/2009.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	No. 2 Fuel Oil	No. 2 Fuel Oil STD ERR	Wood Smoke	Wood Smoke STD ERR
11/8/08	40.0	2.8	0.6	1.8	0.4	11.9	2.3	19.0	2.6
11/11/08	31.9	1.7	0.4	1.3	0.3	8.9	1.4	22.2	2.8
11/14/08	52.1	8.7	1.1	4.4	1.1	0.0	0.0	31.4	2.6
11/17/08	20.7	1.6	0.4	1.5	0.3	5.9	1.3	11.1	1.5
11/20/08	16.8	3.2	0.4	1.1	0.4	0.0	0.0	13.9	1.2
11/23/08	23.4	2.1	0.5	1.5	0.3	8.2	1.7	11.2	1.8
11/26/08	22.0	1.9	0.4	0.9	0.3	7.8	1.5	11.7	1.7
11/29/08	16.4	1.4	0.3	1.2	0.2	4.8	1.1	8.5	1.3
12/2/08	47.0	10.5	1.3	3.1	1.3	0.0	0.0	28.3	2.6
12/5/08	31.0	2.3	0.5	1.5	0.3	9.7	1.9	13.2	1.9
12/8/08	*	*	*	*	*	*	*	*	*
12/11/08	18.9	3.1	0.4	1.5	0.4	0.0	0.0	14.6	1.3
12/14/08	39.0	7.0	0.9	2.8	0.9	0.0	0.0	24.3	2.1
12/17/08	34.9	7.5	0.9	2.2	0.9	0.0	0.0	23.2	2.1
12/20/08	26.1	2.6	0.5	1.9	0.4	9.6	2.1	11.0	2.0
12/23/08	47.5	5.2	0.6	2.7	0.7	0.0	0.0	30.8	2.6
12/26/08	15.9	2.9	0.4	1.1	0.4	0.0	0.0	11.9	1.1
12/29/08	66.0	28.6	3.5	5.8	3.6	0.0	0.0	21.7	2.1
1/1/09	28.2	3.6	0.7	1.4	0.5	9.0	2.7	12.1	2.4
1/4/09	37.3	4.0	0.8	0.7	0.5	15.0	3.1	13.5	2.8
1/7/09	63.7	17.5	2.1	3.8	2.2	0.0	0.0	36.0	3.5
1/10/09	56.7	16.0	2.0	3.5	2.0	0.0	0.0	34.0	3.3
1/13/09	31.4	6.4	0.8	3.2	0.8	0.0	0.0	22.0	1.9
1/16/09	2.3**	**	**	**	**	**	**	**	**
1/19/09	8.2	1.2	0.2	1.2	0.2	2.5	1.0	2.6	0.9
1/22/09	6.4	1.4	0.2	0.4	0.2	0.0	0.0	5.2	0.6
1/25/09	26.7	2.4	0.5	2.9	0.4	10.7	2.2	10.3	2.1
1/28/09	31.5	8.2	1.0	2.4	1.0	0.0	0.0	20.5	1.9
1/31/09	13.4	3.0	0.4	1.2	0.4	0.0	0.0	9.2	1.0
2/3/09	18.7	4.3	0.5	1.6	0.6	0.0	0.0	13.5	1.3
2/5/09	43.1	7.1	0.8	4.5	0.9	0.0	0.0	26.9	1.9
2/6/09	*	*	*	*	*	*	*	*	*
2/7/09	32.6	3.6	0.7	2.3	0.5	14.3	2.8	13.1	2.4
2/9/09	12.3	1.3	0.3	1.1	0.2	4.1	1.0	5.8	1.1
2/12/09	18.6	2.8	0.3	2.7	0.4	0.0	0.0	13.3	1.2
2/15/09	29.6	4.9	0.6	4.1	0.7	0.0	0.0	18.1	1.6
2/18/09	23.3	4.7	0.6	2.2	0.6	0.0	0.0	13.9	1.3
2/21/09	15.6	2.9	0.4	1.6	0.4	0.0	0.0	11.6	1.1
2/24/09	19.6	1.8	0.4	2.2	0.3	7.9	1.6	7.0	1.5
2/27/09	6.9	1.0	0.2	0.5	0.1	2.9	0.8	2.0	0.8
3/2/09	15.7	1.6	0.3	1.3	0.3	6.6	1.3	5.9	1.3
3/5/09	5.7**	**	**	**	**	**	**	**	**
3/8/09	10.2	2.4	0.3	0.9	0.3	0.0	0.0	6.3	0.8
3/11/09	16.1	1.3	0.3	2.3	0.3	4.1	1.2	8.5	1.3

3/14/09	14.9	1.6	0.4	0.8	0.2	7.9	1.3	4.3	1.3
3/17/09	10.0	2.6	0.3	1.1	0.3	0.0	0.0	6.6	0.8
3/20/09	*	*	*	*	*	*	*	*	*
3/23/09	9.6	2.3	0.3	1.2	0.3	0.0	0.0	6.2	0.7
3/26/09	*	*	*	*	*	*	*	*	*
3/29/09	10.0	2.1	0.3	1.2	0.3	0.0	0.0	6.7	0.8
4/1/09	9.6	1.1	0.2	1.1	0.2	3.7	0.9	3.4	1.3
4/4/09	7.8	0.9	0.2	0.5	0.1	3.9	0.7	1.4	0.7
4/7/09	10.4	1.4	0.3	1.2	0.2	5.0	1.1	2.8	1.0
Average	**25.3**	**4.4**	**0.6**	**1.9**	**0.6**	**3.5**	**0.7**	**13.8**	**1.7**

Notes: *No, incomplete, or invalid CMB data set. **Mass was too small to conduct a CMB analysis.

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – Revised OMNI Profiles (with auto / diesel). State Building – Winter 2008/2009.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	No. 2 Fuel Oil	No. 2 Fuel Oil STD ERR	Autos	Autos STD ERR	Diesel	Diesel STD ERR	Wood Smoke	Wood Smoke STD ERR
11/8/08	40.0	2.8	0.6	1.8	0.4	11.9	2.3	**0.0**	**0.0**	**0.0**	**0.0**	19.0	2.6
11/11/08	31.9	1.7	0.4	1.3	0.3	8.9	1.8	**0.0**	**0.0**	1.6	0.8	19.6	3.1
11/14/08	52.1	3.2	0.9	2.5	0.5	29.7	3.2	**0.0**	**0.0**	**0.0**	**0.0**	18.1	4.9
11/17/08	20.7	1.6	0.4	1.5	0.3	5.9	1.3	**0.0**	**0.0**	**0.0**	**0.0**	11.1	1.5
11/20/08	16.8	1.8	0.4	0.6	0.3	7.8	1.4	**0.0**	**0.0**	**0.0**	**0.0**	8.7	1.5
11/23/08	23.4	2.1	0.5	1.5	0.3	8.2	1.7	**0.0**	**0.0**	**0.0**	**0.0**	11.2	1.8
11/26/08	22.0	1.9	0.4	0.9	0.3	7.8	1.5	**0.0**	**0.0**	**0.0**	**0.0**	11.7	1.7
11/29/08	16.4	1.4	0.3	1.2	0.2	4.8	1.1	**0.0**	**0.0**	**0.0**	**0.0**	8.5	1.3
12/2/08	47.0	5.4	1.2	**0.0**	**0.0**	28.5	4.1	**0.0**	**0.0**	**0.0**	**0.0**	8.3	3.6
12/5/08	31.0	1.6	0.5	1.4	0.5	11.3	2.4	2.9	1.4	**0.0**	**0.0**	13.8	3.4
12/8/08	*	*	*	*	*	*	*	*	*	*	*	*	*
12/11/08	18.9	1.5	0.3	0.9	0.2	8.6	1.3	**0.0**	**0.0**	**0.0**	**0.0**	8.3	1.5
12/14/08	39.0	3.0	0.7	1.5	0.4	21.4	2.7	**0.0**	**0.0**	**0.0**	**0.0**	15.4	4.1
12/17/08	34.9	3.8	0.8	**0.0**	**0.0**	21.0	2.9	**0.0**	**0.0**	**0.0**	**0.0**	9.0	2.7
12/20/08	26.1	2.6	0.5	1.9	0.4	9.6	2.1	0.0	0.0	0.0	0.0	11.0	2.0
12/23/08	47.5	5.2	0.6	2.7	0.7	0.0	0.0	0.0	0.0	0.0	0.0	30.8	2.6
12/26/08	15.9	1.7	0.4	0.6	0.2	7.0	1.4	**0.0**	**0.0**	**0.0**	**0.0**	7.3	1.4
12/29/08	*	*	*	*	*	*	*	*	*	*	*	*	*
1/1/09	28.2	3.6	0.7	1.4	0.5	9.0	2.7	0.0	0.0	0.0	0.0	12.1	2.4
1/4/09	37.3	3.4	0.7	**0.0**	**0.0**	17.4	2.4	**0.0**	**0.0**	**0.0**	**0.0**	19.1	4.0
1/7/09	63.7	8.6	1.7	**0.0**	**0.0**	50.5	3.6	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
1/10/09	56.7	7.8	1.5	**0.0**	**0.0**	46.9	3.3	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
1/13/09	31.4	3.8	0.8	2.2	0.6	14.6	3.0	**0.0**	0.0	**0.0**	**0.0**	12.4	2.7
1/16/09	2.3**	**	**	**	**	**	**	**	**	**	**	**	**
1/19/09	8.2	1.2	0.2	1.2	0.2	2.5	1.0	**0.0**	**0.0**	**0.0**	**0.0**	2.6	0.9
1/22/09	6.4	0.9	0.2	0.3	0.1	2.6	0.7	**0.0**	**0.0**	**0.0**	**0.0**	3.4	0.8
1/25/09	26.7	2.4	0.5	2.9	0.4	10.7	2.2	0.0	0.0	0.0	0.0	10.3	2.1
1/28/09	31.5	4.2	0.9	**0.0**	**0.0**	22.3	3.0	**0.0**	**0.0**	**0.0**	**0.0**	8.8	4.3
1/31/09	13.4	1.8	0.4	0.8	0.3	6.5	1.4	**0.0**	**0.0**	**0.0**	**0.0**	4.8	1.3
2/3/09	18.7	2.9	0.6	1.1	0.4	8.4	2.2	**0.0**	**0.0**	**0.0**	**0.0**	7.8	1.9
2/5/09	43.1	3.7	0.7	3.1	0.6	19.3	3.0	**0.0**	**0.0**	**0.0**	**0.0**	13.5	2.6
2/6/09	*	*	*	*	*	*	*	*	*	*	*	*	*
2/7/09	32.6	3.6	0.7	2.3	0.5	14.3	2.8	**0.0**	**0.0**	**0.0**	**0.0**	13.1	2.4
2/9/09	12.3	1.3	0.3	1.1	0.2	4.1	1.0	**0.0**	**0.0**	**0.0**	**0.0**	5.8	1.1
2/12/09	18.6	1.7	0.4	2.2	0.3	5.9	1.4	**0.0**	**0.0**	**0.0**	**0.0**	9.1	1.5
2/15/09	29.6	2.9	0.7	3.1	0.5	12.8	2.6	**0.0**	**0.0**	**0.0**	**0.0**	8.6	2.2
2/18/09	23.3	2.9	0.6	1.5	0.4	10.0	2.3	**0.0**	**0.0**	**0.0**	**0.0**	7.2	2.0
2/21/09	15.6	1.3	0.3	1.0	0.2	9.5	1.3	**0.0**	**0.0**	**0.0**	**0.0**	5.0	1.3
2/24/09	19.6	1.8	0.4	2.2	0.3	7.9	1.6	**0.0**	**0.0**	**0.0**	**0.0**	7.0	1.5
2/27/09	6.9	1.0	0.2	0.5	0.1	2.9	0.8	**0.0**	**0.0**	**0.0**	**0.0**	2.0	0.8
3/2/09	15.7	1.6	0.3	1.3	0.3	6.6	1.3	**0.0**	**0.0**	**0.0**	**0.0**	5.9	1.3
3/5/09	5.7**	**	**	**	**	**	**	**	**	**	**	**	**
3/8/09	10.2	1.5	0.3	0.5	0.2	5.7	1.1	**0.0**	**0.0**	**0.0**	**0.0**	3.3	1.6
3/11/09	16.1	1.3	0.3	2.3	0.3	4.1	1.2	**0.0**	**0.0**	**0.0**	**0.0**	8.5	1.3

3/14/09	14.9	1.6	0.4	0.8	0.2	7.9	1.3	**0.0**	**0.0**	**0.0**	**0.0**	4.3	1.3
3/17/09	10.0	1.1	0.3	0.6	0.2	8.4	0.7	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
3/20/09	*	*	*	*	*	*	*	*	*	*	*	*	*
3/23/09	9.6	1.4	0.3	0.9	0.2	5.0	1.1	**0.0**	**0.0**	**0.0**	**0.0**	2.9	1.0
3/26/09	*	*	*	*	*	*	*	*	*	*	*	*	*
3/29/09	10.0	1.4	0.3	0.8	0.2	4.6	1.1	**0.0**	**0.0**	**0.0**	**0.0**	3.0	1.0
4/1/09	9.6	1.1	0.2	1.1	0.2	3.7	0.9	**0.0**	**0.0**	**0.0**	**0.0**	3.4	1.3
4/4/09	7.8	0.8	0.2	0.5	0.1	4.0	0.7	**0.0**	**0.0**	**0.0**	**0.0**	2.1	1.1
4/7/09	10.4	1.4	0.3	1.2	0.2	5.0	1.1	**0.0**	**0.0**	**0.0**	**0.0**	2.8	1.0
Average	**25.3**	**2.5**	**0.5**	**1.2**	**0.3**	**11.4**	**1.8**	**0.06**	**0.03**	**0.04**	**0.02**	**8.7**	**1.9**

Notes: *No, incomplete, or invalid CMB data set. **Mass was too small to conduct a CMB analysis.

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – EPA Profiles. North Pole – Winter 2008/2009.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	Autos	Autos STD ERR	Diesel	Diesel STD ERR	Wood Smoke	Wood Smoke STD ERR
1/25/09	39.8	2.6	0.3	1.7	0.3	0.0	0.0	0.0	0.0	29.9	3.3
1/28/09	13.8	2.0	0.2	0.9	0.2	0.0	0.0	0.0	0.0	10.7	1.4
1/31/09	9.7	1.3	0.1	0.5	0.2	0.0	0.0	0.0	0.0	7.4	0.9
2/3/09	15.0	1.7	0.2	0.8	0.2	0.0	0.0	0.0	0.0	14.0	1.7
2/5/09	32.1	2.9	0.3	2.4	0.6	3.4	1.0	0.0	0.0	23.8	3.0
2/6/09	26.0	1.9	0.2	1.4	0.3	0.0	0.0	5.0	2.3	18.3	2.4
2/7/09	61.7	5.4	0.6	2.7	0.7	0.0	0.0	0.0	0.0	53.5	5.8
2/9/09	6.0	1.0	0.1	0.7	0.1	0.0	0.0	0.0	0.0	5.3	0.7
2/12/09	32.0	2.1	0.2	1.3	0.3	0.0	0.0	4.8	2.4	24.5	3.1
2/15/09	34.3	2.3	0.3	1.5	0.3	0.0	0.0	0.0	0.0	28.4	3.2
2/18/09	*	*	*	*	*	*	*	*	*	*	*
2/21/09	10.3	1.3	0.1	0.5	0.2	0.0	0.0	0.0	0.0	8.1	1.1
2/24/09	26.1	1.9	0.2	1.1	0.3	0.0	0.0	4.6	2.2	18.3	2.4
2/27/09	6.7	1.4	0.2	0.7	0.2	0.0	0.0	0.0	0.0	4.4	0.7
3/2/09	10.4	1.3	0.1	0.7	0.2	0.0	0.0	0.0	0.0	7.7	1.0
3/5/09	**4.7****	**	**	**	**	**	**	**	**	**	**
3/8/09	6.1	1.1	0.1	0.4	0.1	0.0	0.0	0.0	0.0	4.6	0.7
3/11/09	12.5	1.0	0.1	0.8	0.1	0.0	0.0	0.0	0.0	11.3	2.4
3/14/09	14.1	2.0	0.2	0.6	0.3	0.0	0.0	0.0	0.0	12.1	1.5
3/17/09	**3.8****	**	**	**	**	**	**	**	**	**	**
3/20/09	**4.6****	**	**	**	**	**	**	**	**	**	**
3/23/09	**4.5****	**	**	**	**	**	**	**	**	**	**
3/26/09	**3.0****	**	**	**	**	**	**	**	**	**	**
3/29/09	11.8	1.8	0.2	0.7	0.2	0.0	0.0	0.0	0.0	9.8	2.1
4/1/09	10.6	1.3	0.1	0.5	0.2	0.0	0.0	0.0	0.0	8.2	1.7
4/4/09	7.5	1.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	5.6	1.3
4/7/09	11.4	1.5	0.2	0.0	0.0	0.0	0.0	0.0	0.0	9.2	1.2
Average	**18.9**	**1.9**	**0.2**	**1.0**	**0.2**	**0.2**	**0.0**	**0.7**	**0.3**	**15.0**	**2.0**

Notes: *No, incomplete, or invalid CMB data set. **Mass was too small to conduct a CMB analysis.

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – OMNI Profiles. North Pole – Winter 2008/2009.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	No. 2 Fuel Oil	No. 2 Fuel Oil STD ERR	Wood Smoke	Wood Smoke STD ERR
1/25/09	39.8	1.2	0.2	1.2	0.2	6.3	0.9	30.0	2.4
1/28/09	13.8	1.4	0.2	0.7	0.2	3.1	1.0	8.5	1.1
1/31/09	9.7	0.8	0.1	0.4	0.1	2.2	0.6	5.6	0.8
2/3/09	15.0	1.6	0.2	0.9	0.2	0.0	0.0	13.6	1.0
2/5/09	32.1	1.7	0.3	1.8	0.3	6.5	1.4	21.7	1.8
2/6/09	26.0	0.8	0.2	1.2	0.1	4.9	0.7	20.1	1.8
2/7/09	61.7	5.3	0.6	2.5	0.7	0.0	0.0	48.4	2.7
2/9/09	6.0	1.0	0.1	0.8	0.1	0.0	0.0	5.7	0.6
2/12/09	32.0	1.3	0.2	0.9	0.2	4.0	1.0	22.2	1.6
2/15/09	34.3	1.5	0.3	1.3	0.2	4.6	1.1	22.6	1.7
2/18/09	*	*	*	*	*	*	*	*	*
2/21/09	10.3	1.0	0.2	0.5	0.1	1.6	0.7	7.0	0.9
2/24/09	26.1	1.1	0.2	0.9	0.2	3.7	0.9	16.9	1.4
2/27/09	6.7	1.3	0.1	0.8	0.2	0.0	0.0	4.3	0.6
3/2/09	10.4	1.0	0.2	0.6	0.1	1.7	0.7	6.5	0.8
3/5/09	4.7**	**	**	**	**	**	**	**	**
3/8/09	6.1	1.0	0.1	0.4	0.1	0.0	0.0	4.4	0.6
3/11/09	12.5	0.7	0.1	0.7	0.1	1.4	0.6	8.3	0.9
3/14/09	14.1	1.9	0.2	0.7	0.2	0.0	0.0	12.0	0.9
3/17/09	3.8**	**	**	**	**	**	**	**	**
3/20/09	4.6**	**	**	**	**	**	**	**	**
3/23/09	4.5**	**	**	**	**	**	**	**	**
3/26/09	3.0**	**	**	**	**	**	**	**	**
3/29/09	11.8	1.2	0.2	0.6	0.2	3.2	0.9	5.7	0.9
4/1/09	10.6	1.2	0.1	0.6	0.2	0.0	0.0	8.0	0.9
4/4/09	7.5	1.2	0.1	0.4	0.2	0.0	0.0	5.8	0.8
4/7/09	11.4	1.5	0.2	0.5	0.2	0.0	0.0	9.1	0.8
Average	**18.9**	**1.4**	**0.2**	**0.9**	**0.2**	**2.1**	**0.5**	**13.6**	**1.2**

Notes: *No, incomplete, or invalid CMB data set. **Mass was too small to conduct a CMB analysis.

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – EPA Profiles. RAMS – Winter 2008/2009.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	Wood Smoke	Wood Smoke STD ERR
1/25/09	12.5	1.4	0.2	1.5	0.2	8.8	1.2
1/28/09	7.8	0.9	0.1	0.6	0.1	6.3	0.9
1/31/09	7.2	0.9	0.1	0.6	0.1	6.1	0.9
2/3/09	10.5	1.4	0.2	1.1	0.2	8.4	1.1
2/5/09	8.8	0.7	0.1	0.8	0.1	7.4	0.8
2/6/09	8.5	0.6	0.1	0.9	0.1	7.1	1.0
2/7/09	11.3	1.1	0.1	1.3	0.2	8.8	0.9
2/9/09	5.3	0.7	0.1	0.9	0.1	4.2	0.6
2/12/09	11.8	1.5	0.2	1.6	0.2	8.8	0.9
2/15/09	9.6	0.9	0.1	1.3	0.1	7.4	1.0
2/18/09	6.5	0.7	0.1	0.8	0.1	5.0	0.7
2/21/09	6.2	1.0	0.1	0.6	0.1	4.7	0.7
2/24/09	10.7	1.1	0.1	1.5	0.2	7.6	1.0
2/27/09	6.3	1.0	0.1	0.6	0.1	4.7	0.7
3/2/09	7.4	1.2	0.1	0.7	0.2	5.4	0.7
3/5/09	6.0	1.0	0.1	0.8	0.1	4.4	0.6
3/8/09	6.0	0.9	0.1	0.5	0.1	4.2	0.7
3/11/09	6.3	0.8	0.1	0.8	0.1	5.1	1.2
3/14/09	6.3	1.1	0.1	0.8	0.1	4.4	0.6
3/17/09	4.4**	**	**	**	**	**	**
3/20/09	*	*	*	*	*	*	*
3/23/09	4.7**	**	**	**	**	**	**
3/26/09	3.8**	**	**	**	**	**	**
3/29/09	7.7	1.4	0.2	0.4	0.2	5.6	0.7
4/1/09	9.3	1.7	0.2	1.1	0.2	6.8	1.0
4/4/09	8.3	1.3	0.2	0.4	0.2	6.3	0.8
4/7/09	9.2	1.6	0.2	0.6	0.2	7.6	0.9
Average	**8.2**	**1.1**	**0.1**	**0.9**	**0.1**	**6.3**	**0.8**

Notes: *No, incomplete, or invalid CMB data set. **Mass was too small to conduct a CMB analysis.

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – OMNI Profiles. RAMS – Winter 2008/2009.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	No. 2 Fuel Oil	No. 2 Fuel Oil STD ERR	Wood Smoke	Wood Smoke STD ERR
1/25/09	12.5	0.9	0.2	1.2	0.2	2.5	0.7	7.2	0.9
1/28/09	7.8	0.5	0.1	0.4	0.1	1.7	0.4	5.1	0.7
1/31/09	7.2	0.8	0.1	0.6	0.1	0.0	0.0	6.2	0.6
2/3/09	10.5	0.8	0.1	0.8	0.1	3.3	0.6	6.1	0.9
2/5/09	8.8	0.4	0.1	0.7	0.1	1.0	0.3	6.8	0.7
2/6/09	8.5	0.6	0.1	0.9	0.1	0.0	0.0	7.1	0.7
2/7/09	11.3	0.6	0.1	1.1	0.1	2.0	0.5	8.2	0.9
2/9/09	5.3	0.6	0.1	0.9	0.1	0.0	0.0	4.4	0.5
2/12/09	11.8	1.4	0.2	1.5	0.2	0.0	0.0	9.9	0.8
2/15/09	9.6	0.7	0.1	1.2	0.1	1.2	0.6	6.6	0.8
2/18/09	6.5	0.6	0.1	0.8	0.1	0.0	0.0	5.9	0.8
2/21/09	6.2**	**	**	**	**	**	**	**	**
2/24/09	10.7	0.8	0.2	1.3	0.1	1.6	0.7	6.6	0.8
2/27/09	6.3	1.0	0.1	0.6	0.1	0.0	0.0	5.1	0.8
3/2/09	7.4	0.4	0.1	0.6	0.1	4.2	0.4	2.2	0.6
3/5/09	6.0	0.7	0.1	0.7	0.1	1.2	0.5	2.7	0.7
3/8/09	6.0	0.7	0.1	0.4	0.1	1.2	0.5	3.5	0.6
3/11/09	6.3	0.8	0.1	0.8	0.1	0.0	0.0	3.9	0.5
3/14/09	6.3	1.1	0.1	0.8	0.1	0.0	0.0	4.9	0.6
3/17/09	4.4**	**	**	**	**	**	**	**	**
3/20/09	*	*	*	*	*	*	*	*	*
3/23/09	4.7**	**	**	**	**	**	**	**	**
3/26/09	3.8**	**	**	**	**	**	**	**	**
3/29/09	7.7	0.9	0.2	0.3	0.1	2.4	0.6	4.4	0.8
4/1/09	9.3	1.2	0.2	0.9	0.2	2.5	0.9	4.9	1.3
4/4/09	8.3	0.8	0.1	0.2	0.1	2.9	0.6	3.6	1.0
4/7/09	9.2	0.9	0.2	0.3	0.1	3.7	0.7	4.1	1.1
Average	**8.3**	**0.8**	**0.1**	**0.8**	**0.1**	**1.4**	**0.4**	**5.4**	**0.8**

Notes: *No, incomplete, or invalid CMB data set. **Mass was too small to conduct a CMB analysis.

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – EPA Profiles. Peger Road – Winter 2008/2009.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	Autos	Autos STD ERR	Diesel	Diesel STD ERR	Wood Smoke	Wood Smoke STD ERR
1/25/09	28.6	4.1	0.5	3.5	0.5	0.0	0.0	3.8	1.4	16.5	2.2
1/28/09	31.3	7.7	0.9	2.5	1.0	0.0	0.0	0.0	0.0	20.6	2.6
1/31/09	13.5	2.4	0.3	0.9	0.3	0.0	0.0	0.0	0.0	10.0	2.7
2/3/09	17.8	3.2	0.4	1.1	0.4	0.0	0.0	0.0	0.0	13.2	1.7
2/5/09	48.0	7.6	0.8	3.8	1.0	17.3	5.2	0.0	0.0	23.9	3.5
2/6/09	*	*	*	*	*	*	*	*	*	*	*
2/7/09	32.7	4.8	0.6	2.5	0.6	0.0	0.0	3.1	1.1	22.4	2.8
2/9/09	9.2	1.2	0.1	1.1	0.2	0.0	0.0	1.4	0.6	6.2	1.0
2/12/09	22.8	3.0	0.3	2.2	0.5	0.0	0.0	2.7	0.8	14.9	2.0
2/15/09	32.1	4.7	0.5	4.2	0.8	0.0	0.0	3.5	1.2	19.6	2.6
2/18/09	17.5	3.3	0.4	1.6	0.5	0.0	0.0	1.7	0.8	11.1	1.6
2/21/09	14.6	2.6	0.3	1.0	0.3	0.0	0.0	2.1	1.0	8.3	1.3
2/24/09	20.1	2.9	0.3	2.5	0.5	0.0	0.0	1.8	0.7	13.1	1.8
2/27/09	8.0	1.7	0.2	0.8	0.2	0.0	0.0	0.0	0.0	5.3	0.8
3/2/09	17.5	3.5	0.4	1.5	0.5	0.0	0.0	2.1	0.8	10.9	1.6
3/5/09	5.7	1.0	0.1	0.7	0.2	0.0	0.0	1.0	0.5	2.6	0.6
3/8/09	8.0	1.9	0.2	0.6	0.2	0.0	0.0	0.0	0.0	5.2	1.5
3/11/09	16.6	2.0	0.2	2.2	0.3	0.0	0.0	4.1	1.0	8.2	1.3
3/14/09	11.9	2.6	0.3	0.8	0.4	0.0	0.0	1.6	0.8	6.8	1.1
3/17/09	10.2	2.0	0.2	0.6	0.3	0.0	0.0	0.0	0.0	7.2	0.9
3/20/09	7.4	1.4	0.2	0.5	0.2	0.0	0.0	0.0	0.0	5.0	0.7
3/23/09	11.5	2.2	0.3	0.7	0.3	0.0	0.0	1.7	0.7	6.9	1.0
3/26/09	6.7	0.9	0.1	0.3	0.1	0.0	0.0	0.0	0.0	5.5	0.8
3/29/09	10.9	1.8	0.2	0.9	0.2	0.0	0.0	1.4	0.6	6.8	1.0
4/1/09	13.0	1.9	0.2	1.1	0.3	0.0	0.0	0.0	0.0	9.8	1.2
4/4/09	7.9	1.2	0.1	0.4	0.2	0.0	0.0	0.0	0.0	6.8	1.6
4/7/09	13.3	2.2	0.2	1.3	0.3	0.0	0.0	0.0	0.0	9.4	2.5
Average	**16.8**	**2.8**	**0.3**	**1.5**	**0.4**	**0.7**	**0.2**	**1.2**	**0.5**	**10.6**	**1.6**

Notes: *No, incomplete, or invalid CMB data set.

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – OMNI Profiles. Peger Road – Winter 2008/2009.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	No. 2 Fuel Oil	No. 2 Fuel Oil STD ERR	Wood Smoke	Wood Smoke STD ERR
1/25/09	28.6	2.2	0.4	2.7	0.4	9.9	1.8	12.2	1.7
1/28/09	31.3	7.7	0.9	2.3	1.0	0.0	0.0	21.0	1.6
1/31/09	13.5	1.3	0.2	0.7	0.2	5.8	1.0	5.0	1.1
2/3/09	17.8	3.1	0.4	1.4	0.4	0.0	0.0	13.3	1.0
2/5/09	48.0	3.7	0.7	3.3	0.6	19.9	3.0	17.3	2.7
2/6/09	*	*	*	*	*	*	*	*	*
2/7/09	32.7	2.4	0.5	2.2	0.4	13.9	1.9	14.2	1.9
2/9/09	9.2	0.9	0.2	1.0	0.1	1.9	0.7	6.1	0.8
2/12/09	22.8	1.7	0.3	2.0	0.3	7.3	1.4	12.5	1.5
2/15/09	32.1	2.3	0.5	3.8	0.4	12.2	2.0	13.9	1.9
2/18/09	17.5	3.3	0.4	1.9	0.4	0.0	0.0	12.6	1.0
2/21/09	14.6	1.6	0.3	0.8	0.2	5.3	1.2	6.4	1.2
2/24/09	20.1	2.8	0.3	2.7	0.4	0.0	0.0	14.7	1.1
2/27/09	8.0	1.2	0.2	0.7	0.2	2.8	0.9	3.1	0.9
3/2/09	17.5	3.5	0.4	1.8	0.5	0.0	0.0	12.7	1.0
3/5/09	5.7	0.7	0.1	0.6	0.1	1.5	0.6	2.6	0.7
3/8/09	8.0	1.2	0.2	0.5	0.2	3.5	0.9	2.0	0.9
3/11/09	16.6	1.2	0.2	2.1	0.2	3.7	1.0	8.9	1.1
3/14/09	11.9	1.6	0.3	0.7	0.2	5.7	1.2	4.2	1.1
3/17/09	10.2	1.1	0.2	0.5	0.2	4.1	0.9	4.0	0.9
3/20/09	7.4	0.8	0.1	0.5	0.1	2.8	0.6	2.8	0.7
3/23/09	11.5	1.4	0.3	0.6	0.2	5.3	1.0	4.2	1.0
3/26/09	6.7	0.6	0.1	0.3	0.1	1.6	0.4	4.0	0.9
3/29/09	10.9	1.7	0.2	1.1	0.2	0.0	0.0	8.1	0.8
4/1/09	13.0	1.2	0.2	1.1	0.2	3.4	0.9	7.3	1.4
4/4/09	7.9	0.7	0.1	0.3	0.1	2.7	0.5	4.7	1.0
4/7/09	13.3	1.2	0.2	1.2	0.2	5.0	1.0	4.7	1.0
Average	**16.8**	**2.0**	**0.3**	**1.4**	**0.3**	**4.6**	**0.9**	**8.6**	**1.2**

Notes: *No, incomplete, or invalid CMB data set.

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – Revised OMNI Profiles (with auto / diesel). Peger Road – Winter 2008/2009.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	Autos	Autos STD ERR	Diesel	Diesel STD ERR	No. 2 Fuel Oil	No. 2 Fuel Oil STD ERR	Wood Smoke	Wood Smoke STD ERR
1/25/09	28.6	2.2	0.4	2.7	0.4	0.0	0.0	0.0	0.0	9.9	1.8	12.2	1.7
1/28/09	31.3	3.9	0.7	0.0	0.0	0.0	0.0	0.0	0.0	21.3	2.8	6.7	2.4
1/31/09	13.5	1.3	0.2	0.7	0.2	0.0	0.0	0.0	0.0	5.8	1.0	5.0	1.1
2/3/09	17.8	1.9	0.4	0.9	0.3	0.0	0.0	0.0	0.0	7.2	1.4	8.4	1.4
2/5/09	48.0	3.8	0.7	3.1	0.6	7.4	3.1	0.0	0.0	19.9	3.0	17.8	5.3
2/6/09	*	*	*	*	*	*	*	*	*	*	*	*	*
2/7/09	32.7	2.4	0.5	2.2	0.4	0.0	0.0	0.0	0.0	13.9	1.9	14.2	1.9
2/9/09	9.2	0.9	0.2	1.0	0.1	0.0	0.0	0.0	0.0	1.9	0.7	6.1	0.8
2/12/09	22.8	1.7	0.3	2.0	0.3	0.0	0.0	0.0	0.0	7.3	1.4	12.5	1.5
2/15/09	32.1	2.3	0.5	3.8	0.4	0.0	0.0	0.0	0.0	12.2	2.0	13.9	1.9
2/18/09	17.5	2.1	0.4	1.4	0.3	0.0	0.0	0.0	0.0	6.3	1.6	8.4	1.4
2/21/09	14.6	1.6	0.3	0.8	0.2	0.0	0.0	0.0	0.0	5.3	1.2	6.4	1.2
2/24/09	20.1	1.8	0.3	2.3	0.3	0.0	0.0	0.0	0.0	6.1	1.4	10.6	1.4
2/27/09	8.0	1.2	0.2	0.7	0.2	0.0	0.0	0.0	0.0	2.8	0.9	3.1	0.9
3/2/09	17.5	2.2	0.4	1.2	0.3	0.0	0.0	0.0	0.0	7.3	1.7	7.8	1.5
3/5/09	5.7	0.7	0.1	0.6	0.1	0.0	0.0	0.0	0.0	1.5	0.6	2.6	0.7
3/8/09	8.0	1.2	0.2	0.5	0.2	0.0	0.0	0.0	0.0	3.5	0.9	2.0	0.9
3/11/09	16.6	1.3	0.3	2.1	0.2	0.0	0.0	2.4	1.0	3.6	1.1	6.8	1.2
3/14/09	11.9	1.6	0.3	0.7	0.2	0.0	0.0	0.0	0.0	5.7	1.2	4.2	1.1
3/17/09	10.2	1.1	0.2	0.5	0.2	0.0	0.0	0.0	0.0	4.1	0.9	4.0	0.9
3/20/09	7.4	0.8	0.1	0.5	0.1	0.0	0.0	0.0	0.0	2.8	0.6	2.8	0.7
3/23/09	11.5	1.4	0.3	0.6	0.2	0.0	0.0	0.0	0.0	5.3	1.0	4.2	1.0
3/26/09	6.7	0.6	0.1	0.3	0.1	0.0	0.0	0.0	0.0	1.6	0.4	4.0	0.9
3/29/09	10.9	1.1	0.2	0.8	0.2	0.0	0.0	0.0	0.0	4.0	0.8	5.1	0.9
4/1/09	13.0	1.2	0.2	1.1	0.2	0.0	0.0	0.0	0.0	3.4	0.9	7.3	1.4
4/4/09	7.9	0.7	0.1	0.3	0.1	0.0	0.0	0.0	0.0	2.7	0.5	4.7	1.0
4/7/09	13.3	1.2	0.2	1.2	0.2	0.0	0.0	0.0	0.0	5.0	1.0	4.7	1.0
Average	**16.8**	**1.6**	**0.3**	**1.2**	**0.2**	**0.3**	**0.1**	**0.1**	**0.04**	**6.6**	**1.3**	**7.1**	**1.4**

Notes: *No, incomplete, or invalid CMB data set.

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – EPA Profiles. State Building – Winter 2009/2010.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	Autos	Autos STD ERR	Diesel	Diesel STD ERR	Wood Smoke	Wood Smoke STD ERR
11/3/09	13.8	2.1	0.3	1.1	0.3	3.5	1.3	0.0	0.0	6.4	0.8
11/6/09	5.2	0.8	0.1	0.3	0.1	0.0	0.0	0.0	0.0	4.1	0.2
11/9/09	*	*	*	*	*	*	*	*	*	*	*
11/12/09	4.0**	**	**	**	**	**	**	**	**	**	**
11/15/09	15.7	2.2	0.3	1.4	0.3	0.0	0.0	0.0	0.0	13.0	1.0
11/17/09	21.8	3.3	0.4	2.0	0.4	0.0	0.0	6.1	1.3	9.8	1.5
11/18/09	4.9**	**	**	**	**	**	**	**	**	**	**
11/19/09	10.5	1.5	0.2	1.2	0.2	0.0	0.0	0.0	0.0	7.7	0.8
11/21/09	24.9	3.9	0.5	1.6	0.5	0.0	0.0	0.0	0.0	19.0	1.5
11/24/09	34.2	6.2	0.8	2.7	0.8	0.0	0.0	3.6	1.7	21.1	1.6
11/27/09	20.9	3.1	0.4	1.1	0.4	4.5	1.8	0.0	0.0	12.2	1.8
11/30/09	14	2.7	0.3	1.3	0.3	3.3	1.6	0.0	0.0	6.3	0.9
12/3/09	*	*	*	*	*	*	*	*	*	*	*
12/6/09	0.4**	**	**	**	**	**	**	**	**	**	**
12/9/09	49	9.5	1.2	3.9	1.2	0.0	0.0	9.4	4.5	27.0	5.2
12/10/09	54.4	8.8	1.0	2.2	1.1	0.0	0.0	0.0	0.0	43.9	8.9
12/11/09	43.7	7.4	0.8	4.8	1.0	0.0	0.0	0.0	0.0	29.5	3.5
12/12/09	38.1	6.9	0.8	1.9	0.9	0.0	0.0	0.0	0.0	29.8	2.5
12/13/09	44.4	7.2	0.8	3.8	0.9	12.6	4.0	0.0	0.0	19.1	3.8
12/15/09	4.1**	**	**	**	**	**	**	**	**	**	**
12/18/09	3.6**	**	**	**	**	**	**	**	**	**	**
12/21/09	40.2	6.8	0.8	2.7	0.9	0.0	0.0	0.0	0.0	30.9	2.5
12/24/09	29.8	4.8	0.6	2.3	0.6	0.0	0.0	0.0	0.0	22.5	0.9
12/27/09	24.1	4.5	0.6	1.5	0.6	0.0	0.0	0.0	0.0	19.5	1.6
12/30/09	42.2	8.1	1.0	2.7	1.0	0.0	0.0	0.0	0.0	33.2	2.8
1/2/10	48.6	11.2	1.4	3.4	1.4	0.0	0.0	0.0	0.0	28.3	3.1
1/5/10	52.3	8.8	1.1	3.7	1.1	0.0	0.0	0.0	0.0	42.8	3.5
1/8/10	46.2	9.5	1.2	3.5	1.2	0.0	0.0	0.0	0.0	28.6	1.8
1/11/10	38.5	8.6	1.1	2.4	1.1	0.0	0.0	0.0	0.0	27.3	1.6
1/14/10	11.8	2.4	0.3	1.0	0.3	0.0	0.0	0.0	0.0	8.5	0.7
1/17/10	15.8	2.7	0.3	1.3	0.4	0.0	0.0	0.0	0.0	12.0	1.0
1/20/10	41.0	6.8	0.8	3.1	0.9	0.0	0.0	0.0	0.0	29.1	2.1
1/23/10	30.7	5.5	0.7	2.6	0.7	0.0	0.0	0.0	0.0	23.2	1.0
1/26/10	80.2	18.9	2.3	8.0	2.4	0.0	0.0	0.0	0.0	53.6	3.6
1/29/10	26.4	5.5	0.7	2.2	0.7	0.0	0.0	0.0	0.0	18.4	1.0
2/1/10	24.1	4.0	0.5	5.0	0.6	0.0	0.0	0.0	0.0	15.2	3.0
2/4/10	32.4	7.9	1.0	3.6	1.0	0.0	0.0	0.0	0.0	20.4	1.5
2/7/10	14.6	2.8	0.3	1.7	0.4	0.0	0.0	0.0	0.0	9.7	0.5
2/10/10	22.1	3.2	0.4	3.1	0.5	0.0	0.0	0.0	0.0	15.7	0.6
2/13/10	30.6	4.9	0.6	3.9	0.7	0.0	0.0	0.0	0.0	23.5	1.9
2/16/10	26.3	4.1	0.5	4.0	0.6	0.0	0.0	4.6	2.1	13.8	2.4
2/19/10	22.8	2.6	0.3	3.8	0.4	4.5	1.5	0.0	0.0	12.0	1.5
2/22/10	12.2	2.2	0.3	1.5	0.3	0.0	0.0	0.0	0.0	8.8	0.8
2/25/10	3.1**	**	**	**	**	**	**	**	**	**	**

2/28/10	10.1	1.2	0.1	2.0	0.2	0.0	0.0	0.0	0.0	7.2	0.4
3/3/10	21.3	2.8	0.3	1.8	0.4	0.0	0.0	1.8	0.8	13.9	0.8
3/6/10	3.8**	**	**	**	**	**	**	**	**	**	**
3/9/10	3.4**	**	**	**	**	**	**	**	**	**	**
3/12/10	9.1	1.3	0.2	0.7	0.2	0.0	0.0	0.0	0.0	6.7	0.4
3/15/10	6.9	1.1	0.1	1.1	0.2	0.0	0.0	0.0	0.0	4.8	1.2
Average	**28.8**	**5.2**	**0.6**	**2.5**	**0.7**	**0.7**	**0.3**	**0.6**	**0.3**	**19.5**	**1.9**

Notes: *No, incomplete, or invalid CMB data set. **Mass was too small to conduct a CMB analysis.

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – OMNI Profiles. State Building – Winter 2009/2010.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	Autos	Autos STD ERR	Diesel	Diesel STD ERR	No. 2 Fuel Oil	No. 2 Fuel Oil STD ERR	Wood Smoke	Wood Smoke STD ERR
11/3/09	13.8	1.1	0.2	0.7	0.2	**0.0**	**0.0**	**0.0**	**0.0**	5.3	0.8	6.5	0.9
11/6/09	5.2	0.5	0.1	0.2	0.1	**0.0**	**0.0**	0.4	0.1	1.7	0.4	2.2	0.4
11/9/09	*	*	*	*	*	*	*	*	*	*	*	*	*
11/12/09	4.0**	**	**	**	**	**	**	**	**	**	**	**	**
11/15/09	15.7	1.2	0.2	1.1	0.2	**0.0**	**0.0**	**0.0**	**0.0**	4.5	0.9	10.5	1.0
11/17/09	21.8	1.1	0.5	1.3	0.6	4.2	1.4	**0.0**	**0.0**	9.4	2.7	5.9	2.9
11/18/09	4.9**	**	**	**	**	**	**	**	**	**	**	**	**
11/19/09	10.5	0.8	0.2	1.0	0.1	**0.0**	**0.0**	**0.0**	**0.0**	3.2	0.7	6.3	0.9
11/21/09	24.9	1.8	0.4	1.0	0.3	**0.0**	**0.0**	**0.0**	**0.0**	10.5	1.5	10.8	1.7
11/24/09	34.2	3.3	0.7	1.7	0.5	**0.0**	**0.0**	2.7	0.9	15.9	2.7	6.7	2.9
11/27/09	20.9	1.8	0.4	0.8	0.2	**0.0**	**0.0**	2.0	0.5	7.0	1.4	9.1	1.5
11/30/09	14	1.6	0.3	0.9	0.2	**0.0**	**0.0**	**0.0**	**0.0**	5.8	1.2	5.9	1.3
12/3/09	*	*	*	*	*	*	*	*	*	*	*	*	*
12/6/09	0.4**	**	**	**	**	**	**	**	**	**	**	**	**
12/9/09	*	*	*	*	*	*	*	*	*	*	*	*	*
12/10/09	54.4	5.5	0.9	**0.0**	**0.0**	**0.0**	**0.0**	5.6	2.0	17.4	3.7	26.0	5.1
12/11/09	43.7	2.3	0.6	2.8	0.4	**0.0**	**0.0**	**0.0**	**0.0**	28.4	2.4	8.8	2.4
12/12/09	*	*	*	*	*	*	*	*	*	*	*	*	*
12/13/09	44.4	2.8	0.6	2.4	0.4	**0.0**	**0.0**	**0.0**	**0.0**	23.2	2.4	13.3	2.3
12/15/09	4.1**	**	**	**	**	**	**	**	**	**	**	**	**
12/18/09	3.6**	**	**	**	**	**	**	**	**	**	**	**	**
12/21/09	40.2	3.6	0.8	1.6	0.5	**0.0**	**0.0**	**0.0**	**0.0**	16.1	2.8	18.1	3.1
12/24/09	29.8	2.6	0.5	1.5	0.4	**0.0**	**0.0**	**0.0**	**0.0**	12.1	2.0	11.7	2.2
12/27/09	24.1	2.6	0.5	0.9	0.4	**0.0**	**0.0**	**0.0**	**0.0**	9.8	1.9	12.1	2.2
12/30/09	*	*	*	*	*	*	*	*	*	*	*	*	*
1/2/10	*	*	*	*	*	*	*	*	*	*	*	*	*
1/5/10	*	*	*	*	*	*	*	*	*	*	*	*	*
1/8/10	46.2	6.4	1.2	2.4	0.9	**0.0**	**0.0**	**0.0**	**0.0**	16.8	4.3	13.7	4.7
1/11/10	38.5	5.0	1.0	1.0	0.7	**0.0**	**0.0**	**0.0**	**0.0**	20.4	3.8	7.9	4.2
1/14/10	11.8	1.6	0.3	0.7	0.2	**0.0**	**0.0**	**0.0**	**0.0**	4.8	1.2	2.7	1.3
1/17/10	15.8	1.7	0.3	1.0	0.2	**0.0**	**0.0**	**0.0**	**0.0**	4.9	1.3	8.6	1.4
1/20/10	*	*	*	*	*	*	*	*	*	*	*	*	*
1/23/10	30.7	3.1	0.6	1.7	0.4	**0.0**	**0.0**	**0.0**	**0.0**	12.9	2.4	11.6	2.7
1/26/10	*	*	*	*	*	*	*	*	*	*	*	*	*
1/29/10	26.4	3.2	0.6	1.4	0.4	**0.0**	**0.0**	**0.0**	**0.0**	13.2	2.4	5.9	2.7
2/1/10	24.1	2.1	0.5	4.2	0.5	**0.0**	**0.0**	**0.0**	**0.0**	9.9	2.0	8.5	2.2
2/4/10	*	*	*	*	*	*	*	*	*	*	*	*	*
2/7/10	14.6	1.7	0.3	1.2	0.3	**0.0**	**0.0**	**0.0**	**0.0**	6.2	1.3	3.9	1.5
2/10/10	22.1	1.5	0.4	2.5	0.3	**0.0**	**0.0**	**0.0**	**0.0**	9.2	1.4	7.2	1.5
2/13/10	30.6	2.6	0.6	3.1	0.5	**0.0**	**0.0**	**0.0**	**0.0**	11.7	2.2	14.5	2.4
2/16/10	26.3	2.5	0.5	3.3	0.4	**0.0**	**0.0**	**0.0**	**0.0**	9.2	2.1	4.8	2.3
2/19/10	22.8	1.1	0.3	3.3	0.3	**0.0**	**0.0**	1.9	0.3	7.5	1.3	8.5	1.4
2/22/10	12.2	1.3	0.3	1.1	0.2	**0.0**	**0.0**	0.8	0.4	4.6	1.0	4.3	1.1
2/25/10	3.1**	**	**	**	**	**	**	**	**	**	**	**	**

2/28/10	10.1	0.9	0.2	1.8	0.2	**0.0**	**0.0**	**0.0**	**0.0**	1.7	0.7	4.8	0.8
3/3/10	21.3	1.6	0.3	1.3	0.2	6.7	1.0	**0.0**	**0.0**	6.6	1.3	6.1	1.4
3/6/10	3.8**	**	**	**	**	**	**	**	**	**	**	**	**
3/9/10	3.4**	**	**	**	**	**	**	**	**	**	**	**	**
3/12/10	*	*	*	*	*	*	*	*	*	*	*	*	*
3/15/10	6.9	1.0	0.1	1.1	0.2	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	4.3	0.1
Average	**28.8**	**2.2**	**0.5**	**1.6**	**0.3**	**0.4**	**0.1**	**0.4**	**0.1**	**10.0**	**1.8**	**8.7**	**2.0**

Notes: *No, incomplete, or invalid CMB data set. **Mass was too small to conduct a CMB analysis.

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – EPA Profiles. North Pole – Winter 2009/2010.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	Autos	Autos STD ERR	Diesel	Diesel STD ERR	Wood Smoke	Wood Smoke STD ERR
11/3/09	6.1	0.4	0.0	0.1	0.1	0.0	0.0	0.0	0.0	5.7	0.7
11/9/09	12.9	0.8	0.1	0.5	0.1	0.0	0.0	0.0	0.0	11.0	1.0
11/15/09	16.7	0.9	0.1	0.8	0.1	0.0	0.0	0.0	0.0	13.1	1.3
11/17/09	13.3	1.3	0.1	1.3	0.2	0.0	0.0	0.0	0.0	10.9	1.1
11/18/09	6.5	0.9	0.1	0.9	0.1	0.0	0.0	0.0	0.0	4.6	0.6
11/19/09	*	*	*	*	*	*	*	*	*	*	*
11/21/09	18.5	1.9	0.2	1.0	0.2	0.0	0.0	0.0	0.0	15.0	1.3
11/27/09	27.8	1.4	0.2	0.8	0.2	0.0	0.0	0.0	0.0	25.4	5.0
12/3/09	15.3	1.1	0.1	0.6	0.1	0.0	0.0	0.0	0.0	12.1	1.2
12/9/09	83.5	5.1	0.7	1.3	0.7	0.0	0.0	0.0	0.0	81.0	15.7
12/10/09	80.5	5.9	0.7	1.4	0.8	0.0	0.0	0.0	0.0	73.3	14.3
12/11/09	58.4	4.5	0.5	1.7	0.6	0.0	0.0	0.0	0.0	48.8	5.3
12/12/09	37.9	2.7	0.3	1.8	0.4	0.0	0.0	0.0	0.0	32.6	3.6
12/13/09	54.8	4.2	0.5	1.7	0.6	0.0	0.0	0.0	0.0	46.2	5.0
12/15/09	6.2	0.5	0.1	0.5	0.1	0.0	0.0	0.0	0.0	6.0	0.7
12/21/09	45.0	4.0	0.4	1.8	0.5	0.0	0.0	0.0	0.0	36.1	2.9
12/24/09	25.2	1.5	0.2	0.9	0.2	0.0	0.0	0.0	0.0	20.0	1.7
12/27/09	17.0	1.5	0.2	0.5	0.2	0.0	0.0	0.0	0.0	13.1	1.3
12/30/09	115.4	9.9	1.1	3.1	1.2	0.0	0.0	14.0	3.2	79.0	9.6
1/2/10	53.1	5.0	0.6	1.3	0.6	0.0	0.0	0.0	0.0	44.9	5.0
1/8/10	36.6	2.9	0.3	2.2	0.4	0.0	0.0	0.0	0.0	33.2	5.8
1/11/10	17.6	1.8	0.2	0.5	0.2	5.5	2.1	0.0	0.0	10.6	1.6
1/14/10	4.5**	**	**	**	**	**	**	**	**	**	**
1/17/10	20.0	1.7	0.2	0.9	0.2	4.2	2.1	0.0	0.0	14.0	1.9
1/20/10	53.5	4.3	0.5	1.4	0.6	14.8	3.7	0.0	0.0	32.7	4.2
1/23/10	42.0	2.8	0.3	1.4	0.4	0.0	0.0	0.0	0.0	35.9	6.0
1/26/10	90.9	7.3	0.8	2.4	1.0	0.0	0.0	0.0	0.0	79.1	6.7
1/29/10	3.3**	**	**	**	**	**	**	**	**	**	**
2/1/10	*	*	*	*	*	*	*	*	*	*	*
2/4/10	31.4	3.0	0.3	1.2	0.4	0.0	0.0	7.0	1.3	18.8	2.5
2/7/10	10.3	1.3	0.1	1.1	0.2	0.0	0.0	0.0	0.0	8.2	0.9
2/10/10	32.9	2.8	0.3	1.4	0.4	0.0	0.0	8.0	1.4	18.8	2.5
2/13/10	54.6	3.3	0.4	2.0	0.4	0.0	0.0	0.0	0.0	53.6	10.4
2/16/10	39.6	2.3	0.3	1.7	0.3	12.7	2.8	0.0	0.0	25.0	3.3
2/19/10	*	*	*	*	*	*	*	*	*	*	*
2/22/10	7.0	0.8	0.1	0.8	0.1	0.0	0.0	0.0	0.0	7.0	0.8
2/25/10	3.8**	**	**	**	**	**	**	**	**	**	**
2/28/10	8.2	0.9	0.1	1.2	0.1	0.0	0.0	0.0	0.0	5.7	0.7
3/3/10	28.2	1.5	0.2	0.9	0.2	7.7	2.3	0.0	0.0	16.8	2.3
3/6/10	*	*	*	*	*	*	*	*	*	*	*
3/9/10	4.1**	**	**	**	**	**	**	**	**	**	**
3/12/10	5.6	0.8	0.1	0.5	0.1	0.0	0.0	0.0	0.0	4.3	0.6
3/15/10	7.5	0.9	0.1	0.6	0.1	0.0	0.0	0.0	0.0	6.3	1.4
Average	**33.7**	**2.6**	**0.3**	**1.2**	**0.3**	**1.3**	**0.4**	**0.8**	**0.2**	**27.1**	**3.7**

Notes: *No, incomplete, or invalid CMB data set. **Mass was too small to conduct a CMB analysis.

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – OMNI Profiles. North Pole – Winter 2009/2010.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	Autos	Autos STD ERR	Diesel	Diesel STD ERR	No. 2 Fuel Oil	No. 2 Fuel Oil STD ERR	Wood Smoke	Wood Smoke STD ERR
11/3/09	6.1	0.2	0.0	0.1	0.0	0.0	0.0	2.0	0.8	0.8	0.1	2.8	0.6
11/9/09	12.9	0.5	0.1	0.4	0.1	0.0	0.0	0.0	0.0	1.7	0.3	8.2	1.0
11/15/09	16.7	0.4	0.1	0.6	0.1	0.0	0.0	0.0	0.0	2.1	0.4	11.2	0.9
11/17/09	13.3	0.6	0.1	1.2	0.1	0.0	0.0	0.0	0.0	3.1	0.5	9.8	1.0
11/18/09	6.5	0.6	0.1	0.7	0.1	0.0	0.0	0.0	0.0	1.6	0.5	3.7	0.6
11/19/09	*	*	*	*	*	*	*	*	*	*	*	*	*
11/21/09	18.5	0.8	0.2	0.6	0.1	0.0	0.0	0.0	0.0	4.8	0.6	13.0	1.1
11/27/09	27.8	0.6	0.1	0.6	0.1	0.0	0.0	1.7	0.7	1.7	0.5	27.2	2.1
12/3/09	15.3	0.3	0.1	0.5	0.1	0.0	0.0	2.8	0.8	3.5	0.3	7.3	1.0
12/9/09	83.5	1.7	0.4	0.8	0.3	0.0	0.0	11.9	1.7	16.4	1.5	48.5	4.4
12/10/09	80.5	2.4	0.5	1.0	0.3	0.0	0.0	0.0	0.0	15.5	1.9	62.7	4.8
12/11/09	58.4	1.8	0.4	0.8	0.3	0.0	0.0	0.0	0.0	11.9	1.4	47.2	3.7
12/12/09	37.9	1.5	0.3	1.2	0.2	0.0	0.0	0.0	0.0	6.6	1.2	24.1	1.9
12/13/09	54.8	1.7	0.4	1.3	0.2	0.0	0.0	4.9	1.3	11.5	1.4	39.7	3.6
12/15/09	6.2	0.1	0.0	0.5	0.0	0.0	0.0	1.8	0.6	1.9	0.2	2.2	0.5
12/21/09	45.0	2.3	0.4	1.1	0.3	9.8	3.8	0.0	0.0	8.8	1.7	24.4	2.7
12/24/09	25.2	0.5	0.1	0.7	0.1	0.0	0.0	0.0	0.0	5.6	0.5	15.6	1.2
12/27/09	17.0	0.5	0.1	0.4	0.1	0.0	0.0	0.0	0.0	4.0	0.4	13.5	1.3
12/30/09	115.4	4.0	0.8	1.1	0.5	0.0	0.0	6.2	2.2	26.6	3.1	91.0	7.7
1/2/10	53.1	2.0	0.4	0.9	0.3	0.0	0.0	0.0	0.0	13.7	1.6	43.2	3.7
1/8/10	36.6	1.2	0.3	1.8	0.2	0.0	0.0	4.4	1.1	9.9	1.1	21.5	2.5
1/11/10	17.6	0.8	0.2	0.4	0.1	0.0	0.0	0.0	0.0	4.6	0.6	13.2	1.4
1/14/10	4.5**	**	**	**	**	**	**	**	**	**	**	**	**
1/17/10	20.0	1.0	0.2	0.8	0.1	0.0	0.0	0.0	0.0	3.9	0.8	12.7	1.2
1/20/10	53.5	1.4	0.4	1.0	0.3	0.0	0.0	1.9	0.8	13.4	1.8	35.4	3.3
1/23/10	42.0	1.4	0.3	1.1	0.2	0.0	0.0	9.1	1.4	8.6	1.1	24.1	2.8
1/26/10	90.9	2.6	0.6	2.1	0.4	0.0	0.0	0.0	0.0	22.0	2.2	59.2	5.0
1/29/10	3.3**	**	**	**	**	**	**	**	**	**	**	**	**
2/1/10	*	*	*	*	*	*	*	*	*	*	*	*	*
2/4/10	31.4	1.7	0.3	1.0	0.2	7.2	3.1	0.0	0.0	7.3	1.3	15.7	2.1
2/7/10	10.3	0.2	0.1	1.0	0.1	0.0	0.0	0.0	0.0	5.6	0.4	4.1	0.6
2/10/10	32.9	1.3	0.3	1.2	0.2	9.6	3.1	0.0	0.0	8.1	1.1	15.0	2.0
2/13/10	54.6	1.4	0.3	1.6	0.2	8.8	3.8	0.0	0.0	10.4	1.3	29.5	2.9
2/16/10	39.6	1.0	0.2	1.4	0.2	0.0	0.0	4.7	1.1	5.6	0.9	26.5	2.5
2/19/10	*	*	*	*	*	*	*	*	*	*	*	*	*
2/22/10	7.0	0.0	0.0	0.7	0.1	0.0	0.0	0.0	0.0	4.3	0.2	1.7	0.1
2/25/10	3.8**	**	**	**	**	**	**	**	**	**	**	**	**
2/28/10	8.2	0.5	0.1	1.2	0.1	0.0	0.0	0.0	0.0	1.8	0.4	4.7	0.7
3/3/10	28.2	0.5	0.1	0.7	0.1	0.0	0.0	0.0	0.0	5.6	0.5	15.8	1.2
3/6/10	*	*	*	*	*	*	*	*	*	*	*	*	*
3/9/10	4.1**	**	**	**	**	**	**	**	**	**	**	**	**
3/12/10	5.6	0.5	0.1	0.5	0.1	0.0	0.0	0.0	0.0	1.4	0.4	3.5	0.6
3/15/10	7.5	0.4	0.1	0.5	0.1	0.0	0.0	0.0	0.0	2.5	0.3	4.6	0.9
Average	**33.7**	**1.1**	**0.2**	**0.9**	**0.2**	**1.0**	**0.4**	**1.5**	**0.4**	**7.3**	**0.9**	**22.4**	**2.1**

Notes: *No, incomplete, or invalid CMB data set. **Mass was too small to conduct a CMB analysis.

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – EPA Profiles. RAMS – Winter 2009/2010.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	Autos	Autos STD ERR	Diesel	Diesel STD ERR	Wood Smoke	Wood Smoke STD ERR
11/15/09	34.6	3.0	0.3	1.3	0.4	6.2	2.8	0.0	0.0	24.7	3.2
11/17/09	*	*	*	*	*	*	*	*	*	*	*
11/18/09	*	*	*	*	*	*	*	*	*	*	*
11/19/09	*	*	*	*	*	*	*	*	*	*	*
11/21/09	50.2	4.6	0.5	0.0	0.0	11.3	3.8	0.0	0.0	34.9	4.5
11/27/09	33.7	2.4	0.3	0.8	0.3	0.0	0.0	0.0	0.0	30.1	6.0
12/3/09	22.5	2.3	0.3	0.0	0.0	5.8	2.4	0.0	0.0	14.8	2.1
12/9/09	55.4	6.4	0.7	0.0	0.0	0.0	0.0	8.3	2.1	36.0	4.5
12/10/09	72.2	7.4	0.8	0.0	0.0	0.0	0.0	4.9	2.3	56.8	6.9
12/11/09	57.6	6.2	0.7	0.0	0.0	0.0	0.0	0.0	0.0	53.2	10.5
12/12/09	59.3	7.0	0.8	2.1	0.9	0.0	0.0	0.0	0.0	49.9	5.6
12/13/09	68.7	6.7	0.8	0.0	0.0	24.1	5.2	0.0	0.0	42.0	5.5
12/21/09	52.0	5.1	0.6	0.0	0.0	0.0	0.0	7.6	1.8	35.9	4.5
12/24/09	32.2	3.0	0.3	0.9	0.4	0.0	0.0	5.1	1.3	21.6	2.8
12/27/09	6.6	0.5	0.1	0.3	0.1	0.0	0.0	2.4	0.8	3.4	0.7
12/30/09	68.8	8.5	1.0	0.0	0.0	0.0	0.0	0.0	0.0	60.9	12.1
1/2/10	64.9	8.6	1.0	0.0	0.0	18.3	5.9	0.0	0.0	41.7	5.5
1/8/10	39.0	3.9	0.5	1.1	0.5	0.0	0.0	7.7	1.2	25.2	3.1
1/11/10	52.5	8.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	45.2	9.1
1/14/10	12.5	1.4	0.2	0.8	0.2	0.0	0.0	1.2	0.6	9.2	1.2
1/17/10	24.4	1.9	0.2	0.9	0.3	0.0	0.0	2.2	0.7	20.2	2.5
1/20/10	56.7	5.5	0.7	2.1	0.7	0.0	0.0	0.0	0.0	51.2	10.1
1/23/10	55.4	5.9	0.7	1.8	0.8	0.0	0.0	11.1	2.1	33.6	4.3
1/26/10	*	*	*	*	*	*	*	*	*	*	*
1/29/10	*	*	*	*	*	*	*	*	*	*	*
2/19/10	35.9	4.5	0.5	4.9	0.7	0.0	0.0	8.1	1.6	16.6	2.3
2/22/10	21.4	2.9	0.3	2.0	0.4	0.0	0.0	2.7	0.8	13.6	1.8
2/25/10	7.2	0.8	0.1	0.3	0.1	0.0	0.0	0.0	0.0	5.8	1.1
2/28/10	17.1	1.5	0.2	2.3	0.3	0.0	0.0	0.0	0.0	13.1	2.5
3/3/10	28.4	3.6	0.4	2.1	0.5	0.0	0.0	4.8	1.3	17.2	2.3
3/6/10	5.2	0.7	0.1	0.4	0.1	0.0	0.0	0.0	0.0	4.8	0.6
3/9/10	5.3	0.6	0.1	0.4	0.1	0.0	0.0	0.0	0.0	4.1	0.6
3/12/10	12.0	1.5	0.2	0.7	0.2	0.0	0.0	3.9	0.9	5.6	1.0
3/15/10	12.0	1.2	0.1	1.3	0.2	0.0	0.0	2.3	0.6	7.9	1.1
Average	**36.7**	**4.0**	**0.5**	**0.9**	**0.2**	**2.3**	**0.7**	**2.5**	**0.6**	**26.9**	**4.1**

Notes: *No, incomplete, or invalid CMB data set. **Mass was too small to conduct a CMB analysis.

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – OMNI Profiles. RAMS – Winter 2009/2010.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	Autos	Autos STD ERR	Diesel	Diesel STD ERR	No. 2 Fuel Oil	No. 2 Fuel Oil STD ERR	Wood Smoke	Wood Smoke STD ERR
11/15/09	34.6	1.6	0.3	1.1	0.2	0.0	0.0	0.0	0.0	7.7	1.3	20.6	1.8
11/17/09	*	*	*	*	*	*	*	*	*	*	*	*	*
11/18/09	*	*	*	*	*	*	*	*	*	*	*	*	*
11/19/09	*	*	*	*	*	*	*	*	*	*	*	*	*
11/21/09	50.2	1.5	0.4	0.6	0.2	0.0	0.0	0.0	0.0	14.9	1.3	35.9	2.8
11/27/09	33.7	0.7	0.2	0.6	0.1	7.8	2.1	0.0	0.0	8.8	0.7	15.4	2.0
12/3/09	22.5	1.3	0.2	0.4	0.2	0.0	0.0	0.0	0.0	5.5	1.0	13.0	1.3
12/9/09	55.4	3.3	0.6	0.0	0.0	0.0	0.0	0.0	0.0	17.0	2.3	29.9	2.7
12/10/09	72.2	3.8	0.7	0.0	0.0	0.0	0.0	0.0	0.0	19.8	2.7	41.5	3.5
12/11/09	57.6	2.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	18.5	1.8	42.0	3.5
12/12/09	59.3	3.8	0.7	1.6	0.5	0.0	0.0	0.0	0.0	17.9	2.9	32.8	3.2
12/13/09	68.7	2.2	0.5	1.0	0.3	0.0	0.0	4.4	1.1	20.4	1.8	41.8	3.7
12/21/09	52.0	1.7	0.4	0.5	0.2	0.0	0.0	3.0	0.9	15.2	1.4	34.5	3.1
12/24/09	32.2	1.0	0.2	0.6	0.1	0.0	0.0	3.6	1.0	10.2	0.9	18.5	2.1
12/27/09	6.6	0.1	0.0	0.3	0.0	0.0	0.0	1.6	0.8	2.2	0.2	2.4	0.6
12/30/09	68.8	3.8	0.7	0.0	0.0	0.0	0.0	0.0	0.0	23.3	2.5	49.9	4.3
1/2/10	64.9	2.6	1.2	0.9	0.4	9.3	4.8	0.0	0.0	23.1	2.2	28.2	5.3
1/8/10	39.0	2.3	0.5	0.8	0.3	0.0	0.0	5.7	1.6	12.3	1.8	17.7	2.3
1/11/10	52.5	4.5	0.8	0.0	0.0	0.0	0.0	0.0	0.0	20.1	3.2	21.7	3.0
1/14/10	12.5	0.9	0.2	0.7	0.1	0.0	0.0	0.0	0.0	3.3	0.7	7.7	0.9
1/17/10	24.4	1.1	0.2	0.7	0.2	0.0	0.0	0.0	0.0	5.2	0.9	17.6	1.4
1/20/10	56.7	2.2	0.5	1.7	0.3	0.0	0.0	0.0	0.0	16.1	1.8	42.1	3.8
1/23/10	55.4	3.1	0.6	1.4	0.4	9.4	4.3	0.0	0.0	14.8	2.4	27.2	3.3
1/26/10	*	*	*	*	*	*	*	*	*	*	*	*	*
1/29/10	*	*	*	*	*	*	*	*	*	*	*	*	*
2/19/10	35.9	2.2	0.5	4.6	0.5	0.0	0.0	0.0	0.0	11.4	2.0	15.4	2.0
2/22/10	21.4	1.1	0.3	1.7	0.2	0.0	0.0	0.0	0.0	10.3	1.1	8.6	1.2
2/25/10	7.2	0.3	0.1	0.3	0.1	0.0	0.0	1.4	0.7	2.3	0.3	1.9	0.8
2/28/10	17.1	0.8	0.2	2.2	0.2	0.0	0.0	3.3	0.9	3.8	0.8	7.1	1.5
3/3/10	28.4	1.9	0.4	1.8	0.3	0.0	0.0	0.0	0.0	9.2	1.6	14.2	1.6
3/6/10	5.2	0.3	0.1	0.4	0.1	0.0	0.0	0.0	0.0	1.5	0.3	3.9	0.6
3/9/10	5.3	0.3	0.1	0.3	0.0	0.0	0.0	1.4	0.7	1.7	0.2	2.0	0.7
3/12/10	12.0	0.7	0.1	0.6	0.1	0.0	0.0	0.0	0.0	3.5	0.6	8.0	1.2
3/15/10	12.0	0.7	0.2	1.2	0.1	0.0	0.0	0.0	0.0	3.5	0.6	6.8	0.8
Average	**36.7**	**1.8**	**0.4**	**0.9**	**0.2**	**0.9**	**0.4**	**0.8**	**0.3**	**11.2**	**1.4**	**21.0**	**2.2**

Notes: *No, incomplete, or invalid CMB data set. **Mass was too small to conduct a CMB analysis.

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – EPA Profiles. Peger Road – Winter 2009/2010.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	Autos	Autos STD ERR	Diesel	Diesel STD ERR	Wood Smoke	Wood Smoke STD ERR
11/3/09	13.7	1.7	0.2	1.0	0.4	0.0	0.0	2.4	0.8	8.2	1.2
11/9/09	12.0	1.5	0.2	1.0	0.2	0.0	0.0	2.3	0.9	6.1	1.0
11/15/09	16.2	1.7	0.2	1.2	0.2	0.0	0.0	2.2	0.9	10.4	1.5
11/17/09	13.7	1.7	0.2	1.2	0.4	0.0	0.0	2.0	0.7	8.9	1.2
11/18/09	*	*	*	*	*	*	*	*	*	*	*
11/19/09	*	*	*	*	*	*	*	*	*	*	*
11/21/09	19.1	3.6	0.4	1.1	0.5	0.0	0.0	1.8	0.8	13.0	1.8
11/27/09	16.5	2.7	0.3	1.4	0.4	0.0	0.0	0.0	0.0	15.7	1.4
12/3/09	12.9	1.5	0.2	1.0	0.3	0.0	0.0	2.2	0.6	8.1	1.2
12/9/09	66.6	12.4	1.4	0.0	0.0	0.0	0.0	0.0	0.0	56.3	5.6
12/10/09	64.0	12.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	54.0	5.4
12/11/09	58.8	10.3	1.2	2.7	1.3	0.0	0.0	4.4	2.1	38.4	4.7
12/12/09	36.8	6.3	0.7	2.6	0.8	0.0	0.0	0.0	0.0	29.0	6.0
12/13/09	40.7	6.6	0.7	2.6	0.9	0.0	0.0	0.0	0.0	30.8	7.7
12/21/09	41.7	6.5	0.7	2.1	0.9	0.0	0.0	9.2	2.1	22.1	3.1
12/24/09	28.6	4.8	0.5	2.2	0.6	11.2	3.0	0.0	0.0	10.8	2.6
12/27/09	17.8	2.8	0.3	1.3	0.4	0.0	0.0	5.7	1.2	7.1	1.2
12/30/09	49.9	9.6	1.1	0.0	0.0	0.0	0.0	0.0	0.0	41.9	3.0
1/2/10	45.6	9.5	1.1	3.7	1.2	0.0	0.0	0.0	0.0	29.9	3.7
1/8/10	39.7	7.7	0.9	2.7	1.0	0.0	0.0	0.0	0.0	28.2	7.3
1/11/10	47.1	12.1	1.3	3.1	1.5	0.0	0.0	0.0	0.0	30.3	7.8
1/14/10	9.2	1.0	0.1	0.6	0.1	3.4	1.4	0.0	0.0	3.7	1.2
1/17/10	17.6	2.3	0.3	1.4	0.3	0.0	0.0	3.5	1.0	10.0	1.5
1/20/10	29.6	5.2	0.6	2.6	0.7	0.0	0.0	7.8	1.7	12.7	2.0
1/23/10	32.2	5.0	0.6	2.3	0.7	0.0	0.0	0.0	0.0	24.4	6.2
1/26/10	64.1	11.0	1.2	4.0	1.5	0.0	0.0	0.0	0.0	49.7	4.9
1/29/10	33.9	5.7	0.6	2.2	0.8	0.0	0.0	12.6	2.0	11.5	2.0
2/1/10	23.5	3.5	0.4	3.5	0.5	0.0	0.0	0.0	0.0	16.5	4.6
2/4/10	33.9	7.4	0.8	3.1	1.0	0.0	0.0	0.0	0.0	23.3	6.1
2/7/10	11.1	1.6	0.2	1.2	0.2	0.0	0.0	1.7	0.6	6.5	1.0
2/10/10	33.5	3.8	0.4	4.2	0.6	0.0	0.0	8.5	1.5	15.5	2.2
2/13/10	32.6	4.9	0.5	5.7	1.1	0.0	0.0	6.4	1.7	15.4	2.2
2/16/10	35.9	4.6	0.5	6.2	1.2	0.0	0.0	7.8	1.9	16.8	2.3
2/19/10	33.2	2.9	0.3	6.5	0.5	0.0	0.0	9.4	1.4	14.1	2.0
2/22/10	8.9	0.8	0.1	1.3	0.3	0.0	0.0	2.2	0.7	4.7	0.8
2/25/10	*	*	*	*	*	*	*	*	*	*	*
2/28/10	9.4	0.8	0.1	1.7	0.1	0.0	0.0	0.0	0.0	7.2	1.5
3/3/10	25.8	3.1	0.3	2.1	0.4	0.0	0.0	10.7	1.5	9.4	1.6
3/6/10	6.5	0.6	0.1	0.4	0.1	0.0	0.0	0.0	0.0	5.6	0.8
3/9/10	3.6**	**	**	**	**	**	**	**	**	**	**
3/12/10	7.8	1.0	0.1	0.8	0.1	0.0	0.0	2.5	0.8	3.5	0.7
3/15/10	10.8	0.9	0.1	1.1	0.1	0.0	0.0	0.0	0.0	8.9	1.9
Average	**29.0**	**4.8**	**0.5**	**2.1**	**0.6**	**0.4**	**0.1**	**2.8**	**0.7**	**18.6**	**3.0**

Notes: **Incomplete filter collection, so no model run conducted.

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – OMNI Profiles. Peger Road – Winter 2009/2010.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	Autos	Autos STD ERR	Diesel	Diesel STD ERR	No. 2 Fuel Oil	No. 2 Fuel Oil STD ERR	Wood Smoke	Wood Smoke STD ERR
11/3/09	13.7	0.8	0.2	0.7	0.1	0.0	0.0	0.0	0.0	4.4	0.6	7.3	0.9
11/9/09	12.0	0.6	0.3	0.8	0.3	1.9	0.8	0.0	0.0	3.9	1.3	4.9	1.5
11/15/09	16.2	0.9	0.2	1.0	0.1	0.0	0.0	0.0	0.0	4.1	0.8	9.0	1.0
11/17/09	13.7	1.0	0.2	1.1	0.2	0.0	0.0	0.0	0.0	4.2	0.8	7.4	1.0
11/18/09	*	*	*	*	*	*	*	*	*	*	*	*	*
11/19/09	*	*	*	*	*	*	*	*	*	*	*	*	*
11/21/09	19.1	1.9	0.4	0.8	0.3	0.0	0.0	0.0	0.0	9.6	1.5	8.1	1.4
11/27/09	16.5	1.0	0.4	1.2	0.4	0.0	0.0	3.0	0.8	8.8	2.3	2.7	0.7
12/3/09	12.9	0.7	0.1	0.7	0.1	0.0	0.0	0.0	0.0	4.0	0.6	7.6	0.9
12/9/09	66.6	6.0	1.1	2.1	0.8	0.0	0.0	0.0	0.0	33.8	4.5	27.5	6.2
12/10/09	64.0	5.9	1.1	2.1	0.8	0.0	0.0	0.0	0.0	32.0	4.4	27.0	6.1
12/11/09	58.8	5.2	1.0	2.0	0.7	0.0	0.0	0.0	0.0	30.4	4.1	19.9	3.6
12/12/09	36.8	3.4	0.7	2.2	0.5	0.0	0.0	0.0	0.0	16.1	2.7	11.8	2.4
12/13/09	40.7	3.0	0.6	2.1	0.4	6.2	2.7	0.0	0.0	19.0	2.4	12.2	4.5
12/21/09	41.7	3.4	0.7	1.6	0.5	0.0	0.0	4.3	1.7	17.5	2.6	13.4	2.6
12/24/09	28.6	1.9	0.4	2.1	0.3	0.0	0.0	0.0	0.0	15.1	1.7	9.6	1.7
12/27/09	17.8	1.2	0.2	0.8	0.2	0.0	0.0	3.1	0.7	6.8	1.0	6.9	1.6
12/30/09	49.9	4.2	0.8	1.8	0.6	0.0	0.0	5.6	1.3	27.6	3.3	11.4	4.5
1/2/10	45.6	5.2	1.0	1.9	0.7	0.0	0.0	0.0	0.0	24.0	4.0	13.0	3.3
1/8/10	39.7	3.4	0.7	2.3	0.5	0.0	0.0	3.2	1.1	22.0	2.7	7.4	3.6
1/11/10	47.1	6.2	1.1	0.9	0.8	0.0	0.0	0.0	0.0	32.2	4.6	5.3	5.7
1/14/10	9.2	0.5	0.1	0.5	0.1	0.0	0.0	0.0	0.0	2.3	0.4	6.4	1.0
1/17/10	17.6	1.1	0.2	0.9	0.2	0.0	0.0	0.0	0.0	6.2	0.9	8.4	1.1
1/20/10	29.6	2.5	0.6	1.6	0.6	0.0	0.0	3.4	1.0	13.8	3.0	8.5	3.6
1/23/10	32.2	1.9	0.6	2.0	0.5	3.2	1.4	0.0	0.0	14.9	2.7	10.8	3.5
1/26/10	64.1	5.1	1.0	3.5	0.7	0.0	0.0	4.9	2.0	31.9	4.1	16.2	5.5
1/29/10	33.9	1.9	0.4	1.8	0.3	0.0	0.0	6.8	1.0	17.9	1.7	5.6	2.6
2/1/10	23.5	1.5	0.3	3.2	0.3	0.0	0.0	0.0	0.0	11.0	1.4	4.2	1.9
2/4/10	33.9	4.0	0.7	2.7	0.6	0.0	0.0	0.0	0.0	18.6	3.1	5.0	2.6
2/7/10	11.1	0.9	0.2	1.1	0.2	0.0	0.0	0.0	0.0	4.2	0.8	5.0	0.9
2/10/10	33.5	1.7	0.4	3.9	0.4	0.0	0.0	5.1	1.4	11.5	1.7	9.9	1.9
2/13/10	32.6	2.2	0.7	4.5	0.7	0.0	0.0	4.3	1.2	15.1	3.7	6.6	2.8
2/16/10	35.9	2.0	0.7	5.2	0.8	0.0	0.0	4.5	1.4	14.0	3.7	10.2	3.2
2/19/10	33.2	1.0	0.3	5.5	0.4	0.0	0.0	4.7	1.5	9.6	1.5	10.9	2.0
2/22/10	*	*	*	*	*	*	*	*	*	*	*	*	*
2/25/10	*	*	*	*	*	*	*	*	*	*	*	*	*
2/28/10	9.4	0.6	0.1	1.4	0.1	2.6	1.2	0.0	0.0	1.9	0.5	3.1	1.5
3/3/10	25.8	0.7	0.2	1.9	0.2	0.0	0.0	6.3	0.9	9.9	0.9	8.1	1.6
3/6/10	6.5	0.3	0.1	0.3	0.0	1.8	0.8	0.0	0.0	2.0	0.2	1.7	0.8
3/9/10	3.6**	**	**	**	**	**	**	**	**	**	**	**	**
3/12/10	7.8	0.5	0.2	0.7	0.2	0.0	0.0	1.3	0.5	2.5	0.9	3.1	1.2
3/15/10	10.8	0.5	0.1	1.0	0.1	0.0	0.0	2.2	0.8	2.6	0.4	4.2	1.0
Average	**29.0**	**2.3**	**0.5**	**1.9**	**0.4**	**0.4**	**0.2**	**1.7**	**0.5**	**13.7**	**2.1**	**9.2**	**2.5**

Notes: **Incomplete filter collection, so no model run conducted.

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – EPA Profiles. State Building – Winter 2010/2011.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	Autos	Autos STD ERR	Diesel	Diesel STD ERR	Wood Smoke	Wood Smoke STD ERR
11/1/10	14.5	2.0	0.2	0.9	0.3	0.0	0.0	0.0	0.0	11.5	0.4
11/4/10	3.3**	**	**	**	**	**	**	**	**	**	**
11/7/10	9.6	1.9	0.2	1.2	0.3	0.0	0.0	0.0	0.0	6.5	1.0
11/10/10	8.6	1.2	0.1	0.8	0.2	0.0	0.0	0.0	0.0	6.5	0.2
11/13/10	8.1	1.0	0.1	0.7	0.1	0.0	0.0	0.0	0.0	6.5	0.2
11/16/10	22.0	3.1	0.4	1.4	0.4	0.0	0.0	0.0	0.0	18.2	1.1
11/19/10	17.6	2.4	0.3	1.5	0.3	0.0	0.0	0.0	0.0	13.9	0.5
11/22/10	11.5	2.0	0.2	0.8	0.3	5.9	1.2	0.0	0.0	2.9	0.5
11/25/10	*	*	*	*	*	*	*	*	*	*	*
11/28/10	14.4	2.4	0.3	1.2	0.3	0.0	0.0	0.0	0.0	10.4	0.5
12/1/10	43.1	8.9	1.1	3.1	1.1	0.0	0.0	0.0	0.0	31.0	1.7
12/4/10	7.0	1.3	0.2	0.7	0.2	0.0	0.0	0.0	0.0	5.0	0.7
12/7/10	36.5	7.6	0.9	1.9	1.0	0.0	0.0	0.0	0.0	26.6	3.9
12/10/10	26.1	4.5	0.6	2.2	0.6	0.0	0.0	0.0	0.0	19.1	2.8
12/13/10	15.2	2.4	0.3	1.3	0.3	0.0	0.0	0.0	0.0	11.4	1.6
12/16/10	*	*	*	*	*	*	*	*	*	*	*
12/19/10	*	*	*	*	*	*	*	*	*	*	*
12/22/10	*	*	*	*	*	*	*	*	*	*	*
12/25/10	*	*	*	*	*	*	*	*	*	*	*
12/28/10	*	*	*	*	*	*	*	*	*	*	*
12/31/10	*	*	*	*	*	*	*	*	*	*	*
1/3/11	*	*	*	*	*	*	*	*	*	*	*
1/6/11	*	*	*	*	*	*	*	*	*	*	*
1/9/11	*	*	*	*	*	*	*	*	*	*	*
1/12/11	*	*	*	*	*	*	*	*	*	*	*
1/15/11	*	*	*	*	*	*	*	*	*	*	*
1/18/11	*	*	*	*	*	*	*	*	*	*	*
1/21/11	*	*	*	*	*	*	*	*	*	*	*
1/24/11	*	*	*	*	*	*	*	*	*	*	*
1/27/11	*	*	*	*	*	*	*	*	*	*	*
1/30/11	*	*	*	*	*	*	*	*	*	*	*
2/2/11	*	*	*	*	*	*	*	*	*	*	*
2/5/11	34.9	6.8	0.8	4.4	0.9	0.0	0.0	0.0	0.0	23.3	1.3
2/8/11	33.5	5.0	0.6	3.1	0.7	0.0	0.0	0.0	0.0	26.3	1.0
Average	**20.2**	**3.5**	**0.4**	**1.7**	**0.5**	**0.4**	**0.1**	**0.0**	**0.0**	**14.6**	**1.1**

Notes: *No, incomplete, or invalid CMB data set. **Mass was too small to conduct a CMB analysis.

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – OMNI Profiles. State Building – Winter 2010/2011.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	Autos	Autos STD ERR	Diesel	Diesel STD ERR	No. 2 Fuel Oil	No. 2 Fuel Oil STD ERR	Wood Smoke	Wood Smoke STD ERR
11/1/10	14.5	1.0	0.2	0.5	0.1	0.0	0.0	1.0	0.2	4.5	0.8	7.0	0.9
11/4/10	3.3**	**	**	**	**	**	**	**	**	**	**	**	**
11/7/10	9.6	1.2	0.2	1.0	0.2	0.0	0.0	0.0	0.0	3.2	0.9	3.3	1.0
11/10/10	8.6	0.7	0.1	0.6	0.1	0.0	0.0	0.0	0.0	2.7	0.5	4.1	0.6
11/13/10	8.1	0.7	0.1	0.6	0.1	0.8	0.4	0.0	0.0	1.6	0.5	4.5	0.6
11/16/10	22.0	1.8	0.4	1.3	0.3	2.6	1.2	0.0	0.0	7.2	1.5	7.6	1.6
11/19/10	17.6	1.4	0.3	1.3	0.2	0.0	0.0	0.0	0.0	5.6	1.1	9.2	1.2
11/22/10	11.5	1.8	0.2	0.8	0.2	0.0	0.0	1.5	0.3	0.0	0.0	6.8	0.4
11/25/10	*	*	*	*	*	*	*	*	*	*	*	*	*
11/28/10	14.4	1.4	0.3	0.9	0.2	0.0	0.0	0.0	0.0	5.1	1.1	5.9	1.2
12/1/10	43.1	5.0	1.0	1.7	0.7	0.0	0.0	0.0	0.0	21.4	3.9	10.7	4.3
12/4/10	7.0	0.9	0.2	0.5	0.1	0.0	0.0	0.0	0.0	2.1	0.6	2.7	0.7
12/7/10	36.5	3.8	0.8	1.6	0.5	0.0	0.0	0.0	0.0	20.9	3.1	4.5	3.4
12/10/10	26.1	2.6	0.5	2.1	0.4	0.0	0.0	0.0	0.0	10.2	2.0	8.6	2.2
12/13/10	15.2	1.4	0.3	0.9	0.2	0.0	0.0	0.0	0.0	5.5	1.0	5.7	1.2
12/16/10	*	*	*	*	*	*	*	*	*	*	*	*	*
12/19/10	*	*	*	*	*	*	*	*	*	*	*	*	*
12/22/10	*	*	*	*	*	*	*	*	*	*	*	*	*
12/25/10	*	*	*	*	*	*	*	*	*	*	*	*	*
12/28/10	*	*	*	*	*	*	*	*	*	*	*	*	*
12/31/10	*	*	*	*	*	*	*	*	*	*	*	*	*
1/3/11	*	*	*	*	*	*	*	*	*	*	*	*	*
1/6/11	*	*	*	*	*	*	*	*	*	*	*	*	*
1/9/11	*	*	*	*	*	*	*	*	*	*	*	*	*
1/12/11	*	*	*	*	*	*	*	*	*	*	*	*	*
1/15/11	*	*	*	*	*	*	*	*	*	*	*	*	*
1/18/11	*	*	*	*	*	*	*	*	*	*	*	*	*
1/21/11	*	*	*	*	*	*	*	*	*	*	*	*	*
1/24/11	*	*	*	*	*	*	*	*	*	*	*	*	*
1/27/11	*	*	*	*	*	*	*	*	*	*	*	*	*
1/30/11	*	*	*	*	*	*	*	*	*	*	*	*	*
2/2/11	*	*	*	*	*	*	*	*	*	*	*	*	*
2/5/11	34.9	3.2	0.7	3.0	0.5	0.0	0.0	0.0	0.0	20.4	2.8	3.3	3.1
2/8/11	33.5	2.5	0.6	2.9	0.4	0.0	0.0	0.0	0.0	13.6	2.1	14.0	2.4
Average	**20.2**	**2.0**	**0.4**	**1.3**	**0.3**	**0.2**	**0.1**	**0.2**	**0.04**	**8.3**	**1.5**	**6.5**	**1.7**

Notes: *No, incomplete, or invalid CMB data set. **Mass was too small to conduct a CMB analysis.

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – EPA Profiles. North Pole – Winter 2010/2011.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	Autos	Autos STD ERR	Diesel	Diesel STD ERR	Wood Smoke	Wood Smoke STD ERR
1/9/11	23.4	1.3	0.1	1.3	0.2	0.0	0.0	0.0	0.0	20.8	1.5
1/12/11	11.7	1.0	0.1	0.5	0.1	0.0	0.0	2.2	0.6	8.1	1.1
1/15/11	33.8	2.6	0.3	0.8	0.3	9.8	2.7	0.0	0.0	21.9	2.9
1/18/11	26.8	2.3	0.3	1.1	0.3	0.0	0.0	3.0	1.1	18.7	2.4
1/21/11	40.8	5.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	37.0	7.4
1/24/11	6.5	0.8	0.1	0.4	0.1	0.0	0.0	0.0	0.0	5.5	0.8
1/27/11	14.0	1.1	0.1	0.7	0.1	3.8	1.9	0.0	0.0	7.8	1.2
1/30/11	58.5	3.3	0.4	1.6	0.4	0.0	0.0	0.0	0.0	54.3	10.6
2/2/11	23.3	2.0	0.2	1.5	0.3	0.0	0.0	0.0	0.0	19.4	1.4
2/5/11	28.8	2.2	0.2	1.5	0.3	0.0	0.0	4.0	1.1	19.7	2.5
Average	**26.8**	**2.1**	**0.3**	**0.9**	**0.2**	**1.4**	**0.5**	**0.9**	**0.3**	**21.3**	**3.2**

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – OMNI Profiles. North Pole – Winter 2010/2011.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	Autos	Autos STD ERR	Diesel	Diesel STD ERR	No. 2 Fuel Oil	No. 2 Fuel Oil STD ERR	Wood Smoke	Wood Smoke STD ERR
1/9/11	23.4	0.7	0.1	1.1	0.1	5.3	1.9	0.0	0.0	2.9	0.6	13.0	1.6
1/12/11	11.7	0.7	0.1	0.3	0.1	0.0	0.0	0.0	0.0	1.8	0.5	8.5	0.8
1/15/11	33.8	0.8	0.2	0.6	0.1	0.0	0.0	1.8	0.7	7.3	0.7	22.8	2.1
1/18/11	26.8	0.8	0.2	0.6	0.2	0.0	0.0	1.2	0.6	6.9	1.1	17.8	1.9
1/21/11	40.8	2.6	0.5	0.0	0.0	0.0	0.0	0.0	0.0	13.4	1.9	19.6	2.1
1/24/11	6.5	0.4	0.1	0.4	0.1	0.0	0.0	0.0	0.0	1.6	0.3	4.6	0.6
1/27/11	14.0	0.6	0.1	0.5	0.1	0.0	0.0	0.0	0.0	2.1	0.5	11.4	1.1
1/30/11	58.5	1.4	0.3	1.1	0.2	13.5	2.6	0.0	0.0	8.8	1.2	35.1	4.9
2/2/11	23.3	1.4	0.2	1.3	0.2	0.0	0.0	3.8	1.0	2.5	1.1	14.0	1.9
2/5/11	28.8	0.8	0.2	1.1	0.1	0.0	0.0	1.9	0.7	5.9	0.7	19.0	1.8
Average	**26.8**	**1.0**	**0.2**	**0.7**	**0.1**	**1.9**	**0.5**	**0.9**	**0.3**	**5.3**	**0.8**	**16.6**	**1.9**

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – EPA Profiles. Peger Road – Winter 2010/2011.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	Autos	Autos STD ERR	Diesel	Diesel STD ERR	Wood Smoke	Wood Smoke STD ERR
1/9/11	22.7	3.0	0.3	2.6	0.4	0.0	0.0	0.0	0.0	17.2	4.4
1/12/11	48.4	10.8	1.2	0.0	0.0	0.0	0.0	0.0	0.0	37.3	4.0
1/15/11	24.6	3.8	0.4	1.1	0.5	7.2	3.0	0.0	0.0	12.9	2.0
1/18/11	44.9	9.1	1.0	2.7	1.2	0.0	0.0	0.0	0.0	34.7	7.2
1/21/11	23.3	4.2	0.5	0.0	0.0	0.0	0.0	0.0	0.0	18.2	4.6
1/24/11	12.4	1.7	0.2	1.1	0.3	0.0	0.0	1.5	0.6	8.2	1.2
1/27/11	14.6	2.0	0.2	1.6	0.5	0.0	0.0	3.0	0.7	8.3	1.3
1/30/11	35.4	4.9	0.5	2.8	0.7	0.0	0.0	0.0	0.0	26.5	6.6
2/2/11	25.1	2.6	0.3	4.3	0.4	0.0	0.0	3.8	1.1	13.4	1.8
2/5/11	34.0	5.6	0.6	4.0	0.8	0.0	0.0	0.0	0.0	25.0	6.3
Average	**28.6**	**4.8**	**0.5**	**2.0**	**0.5**	**0.7**	**0.3**	**0.8**	**0.2**	**20.2**	**3.9**

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – OMNI Profiles. Peger Road – Winter 2010/2011.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	Autos	Autos STD ERR	Diesel	Diesel STD ERR	No. 2 Fuel Oil	No. 2 Fuel Oil STD ERR	Wood Smoke	Wood Smoke STD ERR
1/9/11	22.7	1.1	0.5	2.5	0.6	4.1	1.4	0.0	0.0	7.5	2.6	7.4	2.8
1/12/11	48.4	5.1	1.0	1.8	0.7	0.0	0.0	3.2	1.3	29.4	4.0	7.5	5.0
1/15/11	24.6	1.6	0.3	0.8	0.2	0.0	0.0	0.0	0.0	11.8	1.3	11.7	2.1
1/18/11	44.9	4.2	0.8	2.1	0.6	0.0	0.0	0.0	0.0	26.9	3.2	11.0	4.3
1/21/11	23.3	2.0	0.4	0.8	0.3	0.0	0.0	0.0	0.0	11.4	1.6	11.0	2.3
1/24/11	12.4	1.0	0.2	0.8	0.1	0.0	0.0	0.0	0.0	3.7	0.8	7.0	0.9
1/27/11	14.6	1.1	0.2	1.2	0.2	0.0	0.0	0.0	0.0	5.1	0.9	7.4	1.0
1/30/11	35.4	2.0	0.5	2.5	0.5	0.0	0.0	2.5	0.9	14.6	2.4	13.7	3.2
2/2/11	25.1	0.7	0.4	3.5	0.4	2.4	1.0	0.0	0.0	8.5	1.8	11.7	2.0
2/5/11	34.0	2.2	0.5	3.7	0.4	0.0	0.0	3.9	0.9	16.3	2.0	6.8	2.8
Average	**28.6**	**2.1**	**0.5**	**2.0**	**0.4**	**0.6**	**0.2**	**1.0**	**0.3**	**13.5**	**2.1**	**9.5**	**2.6**

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – EPA Profiles. State Building – Winter 2011/2012.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	Autos	Autos STD ERR	Diesel	Diesel STD ERR	Wood Smoke	Wood Smoke STD ERR
11/2/11	11.0	2.2	0.3	0.8	0.3	0.0	0.0	0.0	0.0	8.2	0.7
11/5/11	*	*	*	*	*	*	*	*	*	*	*
11/8/11	10.3	1.6	0.2	0.5	0.2	0.0	0.0	0.0	0.0	8.4	1.2
11/11/11	8.9	1.1	0.1	0.5	0.1	0.0	0.0	0.0	0.0	7.2	0.2
11/14/11	24.6	3.6	0.4	1.2	0.5	0.0	0.0	0.0	0.0	19.8	1.6
11/17/11	32.8	6.2	0.8	2.1	0.8	0.0	0.0	0.0	0.0	23.4	5.7
11/20/11	*	*	*	*	*	*	*	*	*	*	*
11/23/11	14.8	2.1	0.3	0.9	0.3	0.0	0.0	0.0	0.0	11.5	0.7
11/26/11	24.7	4.4	0.5	1.6	0.6	0.0	0.0	0.0	0.0	18.3	1.5
11/29/11	27.2	4.6	0.6	1.5	0.6	0.0	0.0	0.0	0.0	20.2	1.7
12/2/11	14.7	1.9	0.2	1.0	0.2	0.0	0.0	0.0	0.0	11.5	2.1
12/5/11	*	*	*	*	*	*	*	*	*	*	*
12/8/11	27.2	4.4	0.5	1.9	0.6	0.0	0.0	0.0	0.0	21.1	1.7
12/11/11	*	*	*	*	*	*	*	*	*	*	*
12/14/11	24.7	4.0	0.5	1.6	0.5	8.2	2.3	0.0	0.0	9.9	1.3
12/17/11	37.3	5.9	0.7	1.5	0.7	0.0	0.0	0.0	0.0	31.6	5.8
12/20/11	13.8	1.5	0.2	0.8	0.2	0.0	0.0	0.0	0.0	12.1	0.4
12/23/11	6.3**	**	**	**	**	**	**	**	**	**	**
12/26/11	23.1	4.0	0.5	1.6	0.5	8.0	2.4	0.0	0.0	10.9	1.4
12/29/11	31.8	5.7	0.7	1.6	0.7	0.0	0.0	0.0	0.0	25.5	2.1
1/1/12	*	*	*	*	*	*	*	*	*	*	*
1/4/12	14.3	2.0	0.2	1.0	0.3	0.0	0.0	0.0	0.0	11.2	0.9
1/7/12	15.6	3.2	0.4	1.1	0.4	0.0	0.0	0.0	0.0	11.0	1.0
1/10/12	24.4	4.0	0.5	1.2	0.5	0.0	0.0	0.0	0.0	18.0	2.6
1/13/12	23.2	4.8	0.6	1.2	0.6	0.0	0.0	0.0	0.0	17.9	0.9
1/16/12	29.1	6.1	0.8	2.4	0.8	0.0	0.0	8.8	1.6	12.1	1.6
1/19/12	40.5	8.1	1.0	4.0	1.0	0.0	0.0	0.0	0.0	27.3	1.5
1/22/12	*	*	*	*	*	*	*	*	*	*	*
1/25/12	9.8	1.8	0.2	0.8	0.2	0.0	0.0	0.0	0.0	6.9	0.5
1/28/12	36.8	7.6	0.9	2.2	1.0	0.0	0.0	0.0	0.0	18.3	2.0
1/31/12	18.7	4.9	0.6	1.8	0.6	0.0	0.0	0.0	0.0	11.4	1.2
2/3/12	6.5**	**	**	**	**	**	**	**	**	**	**
2/6/12	24.8	3.9	0.5	2.1	0.5	0.0	0.0	0.0	0.0	18.4	1.2
2/9/12	18.1	2.3	0.3	1.2	0.3	0.0	0.0	0.0	0.0	13.8	0.8
2/12/12	18.3	2.1	0.3	1.9	0.3	0.0	0.0	0.0	0.0	14.8	0.8
2/15/12	27.0	4.5	0.6	2.2	0.6	0.0	0.0	0.0	0.0	20.2	2.9
2/18/12	25.6	3.9	0.5	3.2	0.5	0.0	0.0	0.0	0.0	17.5	1.2
2/21/12	13.7	2.9	0.4	1.7	0.4	0.0	0.0	0.0	0.0	9.8	0.9
2/24/12	5.0**	**	**	**	**	**	**	**	**	**	**
2/27/12	4.3**	**	**	**	**	**	**	**	**	**	**
3/1/12	9.0	2.2	0.3	0.8	0.3	0.0	0.0	0.0	0.0	5.8	0.4
3/4/12	*	*	*	*	*	*	*	*	*	*	*
3/7/12	*	*	*	*	*	*	*	*	*	*	*
3/10/12	9.5	2.2	0.3	1.3	0.3	0.0	0.0	0.0	0.0	5.9	0.4
3/13/12	13.9	2.7	0.3	1.4	0.4	0.0	0.0	0.0	0.0	9.7	0.8

3/16/12	16.3	3.4	0.4	1.3	0.4	0.0	0.0	0.0	0.0	11.5	0.9
3/19/12	10.6	2.6	0.3	1.2	0.3	0.0	0.0	0.0	0.0	6.9	1.1
3/22/12	13.3	3.0	0.4	1.4	0.4	0.0	0.0	0.0	0.0	9.2	0.8
3/25/12	11.0	1.7	0.2	1.2	0.2	0.0	0.0	0.0	0.0	7.9	0.5
3/28/12	8.6	1.4	0.2	1.0	0.2	0.0	0.0	0.0	0.0	6.3	0.4
3/31/12	5.4**	**	**	**	**	**	**	**	**	**	**
Average	**20.0**	**3.5**	**0.4**	**1.5**	**0.5**	**0.4**	**0.1**	**0.2**	**0.04**	**14.0**	**1.4**

Notes: *No, incomplete, or invalid CMB data set. **Mass was too small to conduct a CMB analysis.

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – OMNI Profiles. State Building – Winter 2011/2012.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	Autos	Autos STD ERR	Diesel	Diesel STD ERR	No. 2 Fuel Oil	No. 2 Fuel Oil STD ERR	Wood Smoke	Wood Smoke STD ERR
11/2/11	11.0	1.6	0.3	0.6	0.2	0.0	0.0	0.0	0.0	2.4	1.1	6.8	1.3
11/5/11	*	*	*	*	*	*	*	*	*	*	*	*	*
11/8/11	10.3	1.1	0.2	0.3	0.2	0.0	0.0	0.0	0.0	2.2	0.8	6.1	0.9
11/11/11	8.9	0.8	0.1	0.4	0.1	0.0	0.0	0.0	0.0	1.4	0.5	6.3	0.6
11/14/11	24.6	2.3	0.4	0.9	0.3	0.0	0.0	0.0	0.0	5.9	1.7	16.4	1.9
11/17/11	32.8	3.8	0.8	1.2	0.5	0.0	0.0	0.0	0.0	12.9	3.0	12.4	2.0
11/20/11	*	*	*	*	*	*	*	*	*	*	*	*	*
11/23/11	14.8	1.4	0.3	0.6	0.2	0.0	0.0	0.0	0.0	3.7	1.0	6.4	1.2
11/26/11	24.7	2.7	0.5	1.1	0.4	0.0	0.0	0.0	0.0	8.2	2.0	12.5	2.2
11/29/11	27.2	2.8	0.5	0.9	0.4	0.0	0.0	0.0	0.0	8.8	2.1	13.5	2.3
12/2/11	14.7	1.4	0.3	0.9	0.2	0.0	0.0	1.0	0.3	2.2	1.1	8.5	1.2
12/5/11	*	*	*	*	*	*	*	*	*	*	*	*	*
12/8/11	27.2	2.5	0.5	1.2	0.4	0.0	0.0	0.0	0.0	9.8	1.9	13.2	2.1
12/11/11	*	*	*	*	*	*	*	*	*	*	*	*	*
12/14/11	24.7	2.5	0.5	1.1	0.3	4.2	1.6	0.0	0.0	7.5	1.9	10.3	2.1
12/17/11	37.3	3.7	0.7	0.0	0.0	7.9	2.4	0.0	0.0	13.6	2.6	12.2	2.9
12/20/11	13.8	1.4	0.2	0.8	0.2	3.1	0.9	0.0	0.0	0.0	0.0	8.2	0.5
12/23/11	6.3**	**	**	**	**	**	**	**	**	**	**	**	**
12/26/11	23.1	2.2	0.5	1.0	0.4	1.7	0.8	0.0	0.0	8.3	2.1	11.2	2.2
12/29/11	31.8	3.8	0.7	1.1	0.5	0.0	0.0	0.0	0.0	9.0	2.6	20.0	2.9
1/1/12	*	*	*	*	*	*	*	*	*	*	*	*	*
1/4/12	14.3	1.4	0.3	0.8	0.2	0.0	0.0	0.0	0.0	2.9	1.0	9.6	1.1
1/7/12	15.6	2.1	0.4	0.7	0.3	0.0	0.0	0.0	0.0	5.6	1.5	6.4	1.6
1/10/12	24.4	2.7	0.5	0.8	0.4	0.0	0.0	0.0	0.0	6.7	1.9	11.3	2.1
1/13/12	23.2	3.0	0.6	0.6	0.4	0.0	0.0	0.0	0.0	10.1	2.2	8.7	2.4
1/16/12	29.1	3.7	0.8	1.4	0.5	0.0	0.0	5.9	1.0	13.6	2.9	4.8	2.0
1/19/12	40.5	5.2	1.0	2.9	0.7	0.0	0.0	0.0	0.0	15.4	3.6	13.4	4.0
1/22/12	*	*	*	*	*	*	*	*	*	*	*	*	*
1/25/12	9.8	1.2	0.2	0.6	0.2	0.0	0.0	0.8	0.2	2.9	0.9	2.0	1.0
1/28/12	*	*	*	*	*	*	*	*	*	*	*	*	*
1/31/12	*	*	*	*	*	*	*	*	*	*	*	*	*
2/3/12	6.5**	**	**	**	**	**	**	**	**	**	**	**	**
2/6/12	24.8	2.2	0.5	1.6	0.3	0.0	0.0	4.9	0.4	7.7	1.7	4.7	1.9
2/9/12	18.1	1.6	0.3	0.9	0.2	5.4	1.1	0.0	0.0	4.2	1.2	5.2	1.4
2/12/12	18.3	1.4	0.3	1.6	0.2	4.5	0.9	0.0	0.0	4.2	1.1	6.6	1.2
2/15/12	27.0	2.4	0.5	1.5	0.4	0.0	0.0	3.0	0.5	10.4	1.9	6.7	2.1
2/18/12	25.6	2.6	0.5	2.6	0.4	0.0	0.0	0.0	0.0	7.7	2.0	7.7	2.2
2/21/12	13.7	1.9	0.4	1.3	0.3	0.0	0.0	0.9	0.4	5.2	1.6	4.3	1.7
2/24/12	5.0**	**	**	**	**	**	**	**	**	**	**	**	**
2/27/12	4.3**	**	**	**	**	**	**	**	**	**	**	**	**
3/1/12	9.0	1.2	0.2	0.4	0.2	0.0	0.0	0.0	0.0	5.8	0.2	0.0	0.0
3/4/12*	*	*	*	*	*	*	*	*	*	*	*	*	*
3/7/12*	*	*	*	*	*	*	*	*	*	*	*	*	*
3/10/12	9.5	1.6	0.3	1.1	0.2	0.0	0.0	0.0	0.0	2.7	1.2	3.5	1.3

3/13/12	13.9	1.8	0.3	1.0	0.3	0.0	0.0	0.0	0.0	5.6	1.3	2.7	1.4
3/16/12	16.3	2.1	0.3	0.7	0.3	3.8	1.3	0.0	0.0	7.8	0.7	0.0	0.0
3/19/12	10.6	1.7	0.3	0.9	0.2	0.0	0.0	0.0	0.0	4.5	1.3	2.2	1.4
3/22/12	13.3	2.0	0.4	1.0	0.3	0.0	0.0	0.0	0.0	5.6	1.5	2.4	1.6
3/25/12	11.0	1.3	0.2	1.0	0.2	0.0	0.0	0.0	0.0	2.1	1.0	4.8	1.1
3/28/12	8.6	1.0	0.2	0.8	0.2	0.0	0.0	0.0	0.0	2.3	0.8	3.1	0.9
3/31/12	5.4**	**	**	**	**	**	**	**	**	**	**	**	**
Average	**20.0**	**2.2**	**0.4**	**1.0**	**0.3**	**0.8**	**0.2**	**0.5**	**0.1**	**6.4**	**1.5**	**7.6**	**1.6**

Notes: *No, incomplete, or invalid CMB data set. **Mass was too small to conduct a CMB analysis.

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – EPA Profiles. North Pole – Winter 2011/2012.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	Autos	Autos STD ERR	Diesel	Diesel STD ERR	Wood Smoke	Wood Smoke STD ERR
11/2/11	***	***	***	***	***	***	***	***	***	***	***
11/5/11	8.8	0.5	0.1	0.2	0.1	0.0	0.0	0.0	0.0	7.7	1.3
11/8/11	9.2	0.6	0.1	0.3	0.1	0.0	0.0	0.0	0.0	7.7	0.9
11/11/11	12.3	0.5	0.1	0.3	0.1	0.0	0.0	0.0	0.0	12.4	1.2
11/14/11	30.5	1.4	0.2	0.6	0.2	0.0	0.0	0.0	0.0	27.5	4.1
11/17/11	23.2	1.8	0.2	0.7	0.2	0.0	0.0	0.0	0.0	21.7	2.5
11/20/11	82.6	7.7	0.9	2.0	1.0	0.0	0.0	0.0	0.0	63.9	7.1
11/23/11	12.6	0.6	0.1	0.4	0.1	0.0	0.0	0.0	0.0	10.4	1.0
11/26/11	22.4	1.5	0.2	0.7	0.2	0.0	0.0	0.0	0.0	19.2	2.2
11/29/11	30.4	2.6	0.3	0.9	0.3	0.0	0.0	0.0	0.0	28.5	5.7
12/2/11	10.5	0.9	0.1	0.4	0.1	0.0	0.0	0.0	0.0	8.6	1.1
12/5/11	2.5**	**	**	**	**	**	**	**	**	**	**
12/8/11	42.0	2.8	0.3	1.0	0.4	0.0	0.0	0.0	0.0	38.1	3.3
12/11/11	7.9	0.4	0.0	0.1	0.1	0.0	0.0	0.0	0.0	7.0	1.3
12/14/11	16.1	1.1	0.1	0.4	0.1	0.0	0.0	0.0	0.0	14.6	3.0
12/17/11	36.4	2.8	0.3	0.8	0.3	0.0	0.0	0.0	0.0	32.2	2.1
12/20/11	12.5	0.8	0.1	0.3	0.1	0.0	0.0	0.0	0.0	11.6	1.3
12/23/11	5.6**	**	**	**	**	**	**	**	**	**	**
12/26/11	38.3	1.9	0.2	1.0	0.2	0.0	0.0	0.0	0.0	33.3	2.3
12/29/11	34.1	2.6	0.3	1.0	0.3	0.0	0.0	0.0	0.0	31.8	2.9
1/1/12	33.5	2.8	0.4	0.8	0.4	0.0	0.0	0.0	0.0	31.5	2.3
1/4/12	11.6	0.9	0.1	0.7	0.1	0.0	0.0	0.0	0.0	9.5	1.0
1/7/12	10.0	0.9	0.1	0.4	0.1	0.0	0.0	0.0	0.0	8.2	0.9
1/10/12	16.5	1.3	0.2	0.5	0.2	0.0	0.0	0.0	0.0	14.7	3.0
1/13/12	17.8	2.1	0.2	0.6	0.3	4.5	2.2	0.0	0.0	11.2	1.7
1/16/12	43.0	2.6	0.3	1.2	0.4	0.0	0.0	0.0	0.0	39.8	5.9
1/19/12	39.5	3.0	0.3	1.8	0.4	0.0	0.0	5.2	1.3	28.2	3.5
1/22/12	***	***	***	***	***	***	***	***	***	***	***
1/25/12	***	***	***	***	***	***	***	***	***	***	***
1/28/12	64.9	4.7	0.5	1.5	0.6	0.0	0.0	0.0	0.0	48.5	3.1
1/31/12	14.5	2.1	0.2	1.0	0.3	0.0	0.0	0.0	0.0	12.3	1.2
2/3/12	***	***	***	***	***	***	***	***	***	***	***
2/6/12	42.8	3.0	0.3	1.6	0.4	0.0	0.0	0.0	0.0	32.9	2.3
2/9/12	***	***	***	***	***	***	***	***	***	***	***
2/12/12	***	***	***	***	***	***	***	***	***	***	***
2/15/12	9.0	0.7	0.1	0.3	0.1	0.0	0.0	0.0	0.0	8.3	1.1
2/18/12	29.2	2.1	0.2	1.1	0.3	0.0	0.0	0.0	0.0	25.4	3.8
2/21/12	13.2	0.6	0.1	0.3	0.1	0.0	0.0	0.0	0.0	12.5	2.0
2/24/12	3.5**	**	**	**	**	**	**	**	**	**	**
2/27/12	2.1**	**	**	**	**	**	**	**	**	**	**
3/1/12	5.1**	**	**	**	**	**	**	**	**	**	**
3/4/12	26.0	2.1	0.2	0.8	0.3	5.2	2.3	0.0	0.0	18.8	2.5
3/7/12	4.1**	**	**	**	**	**	**	**	**	**	**
3/10/12	11.1	1.4	0.2	0.6	0.2	0.0	0.0	0.0	0.0	8.6	1.1

3/13/12	4.3**	**	**	**	**	**	**	**	**	**	**
3/16/12	5.5**	**	**	**	**	**	**	**	**	**	**
3/19/12	18.3	1.9	0.2	0.8	0.2	0.0	0.0	0.0	0.0	14.7	1.8
3/22/12	8.3	1.4	0.2	0.5	0.2	0.0	0.0	0.0	0.0	6.8	0.9
3/25/12	6.5	0.8	0.1	0.4	0.1	0.0	0.0	0.0	0.0	4.9	0.7
Average	**24.2**	**1.8**	**0.2**	**0.7**	**0.2**	**0.3**	**0.1**	**0.1**	**0.04**	**20.4**	**2.3**

Notes: *No, incomplete, or invalid CMB data set. **Mass was too small to conduct a CMB analysis. ***Couldn't get a good statistical fit during CMB modeling.

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – OMNI Profiles. North Pole – Winter 2011/2012.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	Autos	Autos STD ERR	No. 2 Fuel Oil	No. 2 Fuel Oil STD ERR	Wood Smoke	Wood Smoke STD ERR
11/2/11	***	***	***	***	***	***	***	***	***	***	***
11/5/11	8.8	0.4	0.1	0.2	0.1	2.2	0.9	0.0	0.0	4.4	1.1
11/8/11	9.2	0.4	0.1	0.2	0.1	0.0	0.0	0.6	0.3	8.1	0.9
11/11/11	12.3	0.4	0.1	0.2	0.1	0.0	0.0	0.0	0.0	10.5	1.0
11/14/11	30.5	0.7	0.1	0.5	0.1	0.0	0.0	2.0	0.5	26.3	1.9
11/17/11	23.2	1.4	0.2	0.4	0.2	0.0	0.0	2.4	1.0	18.0	1.5
11/20/11	82.6	3.9	0.7	0.0	0.0	0.0	0.0	16.0	2.7	69.5	5.8
11/23/11	12.6	0.4	0.1	0.3	0.1	0.0	0.0	0.8	0.3	7.8	0.9
11/26/11	22.4	1.1	0.2	0.5	0.2	0.0	0.0	2.3	0.8	16.6	1.3
11/29/11	30.4	1.9	0.3	0.5	0.3	0.0	0.0	4.0	1.4	19.6	1.7
12/2/11	10.5	0.9	0.1	0.4	0.1	0.0	0.0	0.0	0.0	8.6	0.7
12/5/11	2.5**	**	**	**	**	**	**	**	**	**	**
12/8/11	42.0	1.5	0.3	0.8	0.2	0.0	0.0	4.5	1.1	36.6	2.7
12/11/11	7.9	0.3	0.0	0.1	0.0	0.0	0.0	0.0	0.0	7.2	0.9
12/14/11	16.1	0.7	0.1	0.3	0.1	0.0	0.0	1.4	0.5	14.0	1.3
12/17/11	36.4	1.8	0.3	0.5	0.2	0.0	0.0	4.0	1.3	28.9	2.5
12/20/11	12.5	0.7	0.1	0.3	0.1	2.7	1.2	0.0	0.0	8.8	1.6
12/23/11	5.6**	**	**	**	**	**	**	**	**	**	**
12/26/11	38.3	1.1	0.2	0.8	0.2	0.0	0.0	2.5	0.9	24.7	2.1
12/29/11	34.1	1.2	0.2	0.6	0.2	3.7	1.7	5.7	0.9	22.8	2.9
1/1/12	33.5	4.1	0.5	0.0	0.0	0.0	0.0	0.0	0.0	25.4	1.9
1/4/12	11.6	0.7	0.1	0.7	0.1	0.0	0.0	0.0	0.0	10.6	0.9
1/7/12	10.0	0.5	0.1	0.3	0.1	0.0	0.0	1.1	0.4	8.1	0.8
1/10/12	16.5	1.1	0.1	0.4	0.1	0.0	0.0	0.0	0.0	17.8	1.3
1/13/12	17.8	1.5	0.3	0.0	0.0	0.0	0.0	3.5	1.0	10.5	1.2
1/16/12	43.0	1.4	0.3	0.9	0.2	0.0	0.0	4.1	1.0	37.0	2.7
1/19/12	39.5	2.0	0.4	1.3	0.3	0.0	0.0	5.2	1.5	27.6	2.0
1/22/12	***	***	***	***	***	***	***	***	***	***	***
1/25/12	***	***	***	***	***	***	***	***	***	***	***
1/28/12	***	***	***	***	***	***	***	***	***	***	***
1/31/12	14.5	1.5	0.3	0.8	0.2	0.0	0.0	3.2	1.1	11.1	1.2
2/3/12	***	***	***	***	***	***	***	***	***	***	***
2/6/12	42.8	2.1	0.4	1.3	0.3	10.2	2.8	3.7	1.5	17.0	2.5
2/9/12	***	***	***	***	***	***	***	***	***	***	***
2/12/12	***	***	***	***	***	***	***	***	***	***	***
2/15/12	9.0	0.5	0.1	0.3	0.1	0.0	0.0	0.0	0.0	8.3	0.7
2/18/12	29.2	1.4	0.2	1.0	0.2	0.0	0.0	2.4	1.0	22.2	1.9
2/21/12	13.2	0.4	0.1	0.3	0.1	0.0	0.0	0.0	0.0	12.6	1.1
2/24/12	3.5**	**	**	**	**	**	**	**	**	**	**
2/27/12	2.1**	**	**	**	**	**	**	**	**	**	**
3/1/12	5.1**	**	**	**	**	**	**	**	**	**	**
3/4/12	26.0	1.6	0.3	0.5	0.2	0.0	0.0	2.9	1.1	18.2	1.5
3/7/12	4.1**	**	**	**	**	**	**	**	**	**	**
3/10/12	11.1	0.9	0.2	0.5	0.1	0.0	0.0	2.0	0.7	7.4	0.9
3/13/12	4.3**	**	**	**	**	**	**	**	**	**	**

3/16/12	5.5**	**	**	**	**	**	**	**	**	**	**
3/19/12	18.3	1.3	0.2	0.5	0.2	0.0	0.0	3.5	0.9	12.0	1.2
3/22/12	8.3	0.8	0.1	0.4	0.1	0.0	0.0	2.5	0.6	5.0	1.1
3/25/12	6.5	0.8	0.1	0.4	0.1	0.0	0.0	0.0	0.0	4.7	0.6
Average	**23.0**	**1.2**	**0.2**	**0.5**	**0.1**	**0.6**	**0.2**	**2.4**	**0.7**	**17.3**	**1.6**

Notes: *No, incomplete, or invalid CMB data set. **Mass was too small to conduct a CMB analysis. ***Couldn't get a good statistical fit during CMB modeling.

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – EPA Profiles. RAMS – Winter 2011/2012.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	Autos	Autos STD ERR	Diesel	Diesel STD ERR	Wood Smoke	Wood Smoke STD ERR
12/20/11	21.8	1.5	0.2	0.9	0.2	0.0	0.0	0.0	0.0	15.6	1.4
12/23/11	13.7	1.0	0.1	0.4	0.1	0.0	0.0	0.0	0.0	8.8	1.1
12/26/11	45.0	4.0	0.4	1.6	0.5	0.0	0.0	0.0	0.0	29.4	2.3
12/29/11	24.6	3.9	0.4	1.4	0.5	0.0	0.0	0.0	0.0	18.9	2.3
1/1/12	21.3	3.5	0.4	1.4	0.4	6.7	2.8	0.0	0.0	11.1	1.8
1/4/12	15.1	2.0	0.2	1.0	0.3	0.0	0.0	1.9	0.9	9.9	1.4
1/7/12	23.4	2.7	0.3	1.0	0.3	0.0	0.0	0.0	0.0	18.1	1.7
1/10/12	16.2	2.8	0.3	0.8	0.4	0.0	0.0	0.0	0.0	15.6	1.4
1/13/12	***	***	***	***	***	***	***	***	***	***	***
1/16/12	13.5	1.7	0.2	1.5	0.2	0.0	0.0	0.0	0.0	16.1	1.4
1/19/12	3.1**	**	**	**	**	**	**	**	**	**	**
1/22/12	0.8**	**	**	**	**	**	**	**	**	**	**
1/25/12	0.7**	**	**	**	**	**	**	**	**	**	**
1/28/12	2.8**	**	**	**	**	**	**	**	**	**	**
1/31/12	23.5	3.6	0.4	1.2	0.5	0.0	0.0	0.0	0.0	19.8	1.7
2/3/12	5.6**	**	**	**	**	**	**	**	**	**	**
2/6/12	24.8	4.1	0.5	1.9	0.5	0.0	0.0	0.0	0.0	18.0	4.6
2/9/12	19.4	2.3	0.3	1.2	0.3	0.0	0.0	4.3	1.1	11.0	1.6
2/12/12	18.1	2.1	0.2	1.7	0.3	0.0	0.0	3.7	1.0	9.3	1.4
2/15/12	30.8	4.4	0.5	2.1	0.6	0.0	0.0	6.9	1.5	14.5	2.1
2/18/12	25.9	3.8	0.4	2.9	0.5	7.0	3.0	0.0	0.0	13.3	2.0
2/21/12	17.0	2.4	0.3	1.2	0.3	0.0	0.0	2.9	1.0	9.6	1.4
2/24/12	5.9**	**	**	**	**	**	**	**	**	**	**
2/27/12	3.5*	**	**	**	**	**	**	**	**	**	**
Average	**22.1**	**2.9**	**0.3**	**1.4**	**0.4**	**0.9**	**0.4**	**1.2**	**0.3**	**14.9**	**1.8**

Notes: *No, incomplete, or invalid CMB data set. **Mass was too small to conduct a CMB analysis. ***Couldn't get a good statistical fit during CMB modeling.

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – OMNI Profiles. RAMS – Winter 2011/2012.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	Autos	Autos STD ERR	Diesel	Diesel STD ERR	No. 2 Fuel Oil	No. 2 Fuel Oil STD ERR	Wood Smoke	Wood Smoke STD ERR
12/20/11	21.8	1.3	0.2	0.9	0.2	0.0	0.0	0.0	0.0	0.0	0.0	12.1	1.1
12/23/11	13.7	0.9	0.1	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	6.8	0.8
12/26/11	45.0	2.3	0.4	0.9	0.3	0.0	0.0	0.0	0.0	8.5	1.7	14.3	2.4
12/29/11	24.6	2.5	0.5	0.8	0.3	0.0	0.0	0.0	0.0	7.7	1.9	13.3	1.8
1/1/12	21.3	2.5	0.4	1.1	0.3	0.0	0.0	0.0	0.0	4.3	1.8	11.5	1.7
1/4/12	15.1	1.3	0.2	0.8	0.2	0.0	0.0	0.0	0.0	3.5	1.0	8.9	1.1
1/7/12	23.4	1.7	0.3	0.6	0.2	0.0	0.0	0.0	0.0	5.5	1.2	11.8	1.9
1/10/12	16.2	1.8	0.3	0.7	0.2	0.0	0.0	4.4	1.2	5.7	1.3	3.5	0.6
1/13/12	***	***	***	***	***	***	***	***	***	***	***	***	***
1/16/12	***	***	***	***	***	***	***	***	***	***	***	***	***
1/19/12	3.1**	**	**	**	**	**	**	**	**	**	**	**	**
1/22/12	0.8**	**	**	**	**	**	**	**	**	**	**	**	**
1/25/12	0.7**	**	**	**	**	**	**	**	**	**	**	**	**
1/28/12	2.8**	**	**	**	**	**	**	**	**	**	**	**	**
1/31/12	23.5	2.3	0.4	1.0	0.3	0.0	0.0	0.0	0.0	6.9	1.7	17.0	1.8
2/3/12	5.6**	**	**	**	**	**	**	**	**	**	**	**	**
2/6/12	24.8	2.8	0.5	1.4	0.4	5.2	2.4	0.0	0.0	6.2	2.1	10.4	3.6
2/9/12	19.4	1.6	0.3	1.0	0.2	0.0	0.0	0.0	0.0	2.8	1.2	12.6	1.3
2/12/12	18.1	0.9	0.4	1.4	0.4	3.0	1.1	0.0	0.0	4.4	2.0	9.3	2.3
2/15/12	30.8	2.3	0.7	1.5	0.8	5.2	1.8	0.0	0.0	7.8	3.8	14.9	4.4
2/18/12	25.9	2.3	0.4	2.3	0.4	0.0	0.0	0.0	0.0	7.2	1.6	16.9	2.4
2/21/12	17.0	1.7	0.3	1.0	0.2	0.0	0.0	0.0	0.0	3.1	1.2	10.0	1.2
2/24/12	5.9**	**	**	**	**	**	**	**	**	**	**	**	**
2/27/12	3.5**	**	**	**	**	**	**	**	**	**	**	**	**
Average	**22.1**	**1.9**	**0.4**	**1.0**	**0.3**	**0.9**	**0.4**	**0.3**	**0.1**	**4.9**	**1.5**	**11.5**	**1.9**

Notes: *No, incomplete, or invalid CMB data set. **Mass was too small to conduct a CMB analysis. ***Couldn't get a good statistical fit during CMB modeling.

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – EPA Profiles. NCORE – Winter 2011/2012.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	Autos	Autos STD ERR	Diesel	Diesel STD ERR	Wood Smoke	Wood Smoke STD ERR
11/2/11	12.8	2.2	0.2	0.8	0.3	0.0	0.0	0.0	0.0	9.5	1.0
11/5/11	7.5	1.0	0.1	0.4	0.1	0.0	0.0	0.0	0.0	6.4	1.5
11/8/11	12.7	1.6	0.2	0.6	0.2	0.0	0.0	0.0	0.0	10.3	1.0
11/11/11	14.0	1.2	0.1	0.6	0.2	0.0	0.0	0.0	0.0	13.6	1.3
11/14/11	17.8	2.7	0.3	1.1	0.3	0.0	0.0	3.2	1.1	11.0	1.6
11/17/11	38.1	5.2	0.6	1.9	0.7	0.0	0.0	0.0	0.0	30.8	2.2
11/20/11	30.4	5.8	0.6	1.7	0.7	0.0	0.0	4.0	1.8	18.4	2.5
11/23/11	12.6	2.3	0.3	0.9	0.3	0.0	0.0	0.0	0.0	9.7	1.0
11/26/11	31.9	3.7	0.4	1.5	0.5	0.0	0.0	0.0	0.0	25.6	1.8
11/29/11	22.3	3.9	0.4	1.4	0.5	0.0	0.0	1.8	0.9	15.4	2.0
12/2/11	12.8	1.7	0.2	0.9	0.2	0.0	0.0	1.5	0.6	8.9	1.2
12/5/11	5.1**	**	**	**	**	**	**	**	**	**	**
12/8/11	27.4	3.6	0.4	1.5	0.5	9.9	3.0	0.0	0.0	12.6	1.9
12/11/11	9.0	1.2	0.1	0.5	0.3	0.0	0.0	1.8	0.6	5.8	0.9
12/14/11	28.3	4.1	0.5	1.6	0.5	9.7	3.2	0.0	0.0	12.9	2.0
12/17/11	29.7	5.4	0.6	1.4	0.7	0.0	0.0	6.5	1.7	15.9	2.3
12/20/11	10.8	1.5	0.2	0.9	0.2	0.0	0.0	2.0	0.9	6.2	1.0
12/23/11	5.6**	**	**	**	**	**	**	**	**	**	**
12/26/11	24.9	4.0	0.4	1.6	0.5	9.5	3.1	0.0	0.0	12.0	1.9
12/29/11	23.6	4.1	0.5	1.5	0.6	0.0	0.0	1.9	0.9	16.4	2.2
1/1/12	28.0	3.3	0.4	1.4	0.4	0.0	0.0	0.0	0.0	23.5	2.1
1/4/12	33.6	0.8	0.2	1.1	0.1	0.0	0.0	0.0	0.0	24.0	1.8
1/7/12	14.6	2.8	0.3	1.0	0.4	0.0	0.0	0.0	0.0	11.0	1.1
1/10/12	19.6	3.8	0.4	1.1	0.5	0.0	0.0	0.0	0.0	15.3	1.4
1/13/12	19.0	4.3	0.5	1.1	0.5	0.0	0.0	0.0	0.0	13.2	1.5
1/16/12	26.4	4.9	0.6	2.0	0.6	0.0	0.0	4.9	1.6	14.4	2.1
1/19/12	38.0	6.5	0.7	3.6	0.8	0.0	0.0	6.7	2.0	19.2	2.7
1/22/12	3.3**	**	**	**	**	**	**	**	**	**	**
1/25/12	9.0	1.6	0.2	0.6	0.2	0.0	0.0	0.0	0.0	7.1	1.6
1/28/12	28.1	5.7	0.6	1.5	0.7	0.0	0.0	0.0	0.0	20.2	3.3
1/31/12	20.1	3.8	0.4	1.7	0.7	0.0	0.0	3.5	1.1	11.1	1.6
2/3/12	6.7	1.1	0.1	0.5	0.1	0.0	0.0	0.0	0.0	5.0	1.2
2/6/12	24.7	3.9	0.4	2.0	0.5	0.0	0.0	0.0	0.0	9.0	1.5
2/9/12	24.0	2.4	0.3	1.3	0.3	0.0	0.0	0.0	0.0	14.4	1.4
2/12/12	17.0	2.2	0.3	1.7	0.5	0.0	0.0	2.8	0.8	10.9	1.6
2/15/12	30.7	4.5	0.5	2.2	0.6	0.0	0.0	9.4	1.6	12.7	2.0
2/18/12	26.9	3.9	0.4	3.0	0.5	6.5	3.0	0.0	0.0	13.3	2.0
2/21/12	16.2	2.4	0.3	1.3	0.3	0.0	0.0	1.9	0.7	10.8	1.4
2/24/12	5.7**	**	**	**	**	**	**	**	**	**	**
2/27/12	3.6**	**	**	**	**	**	**	**	**	**	**
3/1/12	13.9	2.5	0.3	0.9	0.3	0.0	0.0	1.9	0.7	8.5	1.2
3/4/12	13.1	2.4	0.3	0.9	0.3	0.0	0.0	2.2	0.7	7.1	1.1
3/7/12	6.4	1.0	0.1	0.8	0.1	0.0	0.0	1.3	0.6	3.3	0.6
3/10/12	9.8	2.0	0.2	1.0	0.3	0.0	0.0	0.0	0.0	6.8	0.9

3/13/12	15.8	3.0	0.3	1.3	0.4	0.0	0.0	0.0	0.0	13.1	1.7
3/16/12	17.1	3.2	0.4	1.3	0.4	0.0	0.0	3.9	1.2	8.2	1.3
3/19/12	12.1	2.4	0.3	1.2	0.3	0.0	0.0	0.0	0.0	8.2	1.0
3/22/12	13.3	2.8	0.3	1.3	0.4	0.0	0.0	2.3	1.0	6.5	1.1
3/25/12	***	***	***	***	***	***	***	***	***	***	***
3/28/12	9.2	1.5	0.2	1.2	0.2	0.0	0.0	0.0	0.0	8.0	1.1
3/31/12	5.6**	**	**	**	**	**	**	**	**	**	**
Average	**19.5**	**3.0**	**0.3**	**1.3**	**0.4**	**0.8**	**0.3**	**1.4**	**0.5**	**12.4**	**1.6**

Notes: *No, incomplete, or invalid CMB data set. **Mass was too small to conduct a CMB analysis. ***Couldn't get a good statistical fit during CMB modeling.

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – OMNI Profiles. NCORE – Winter 2011/2012.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	Autos	Autos STD ERR	Diesel	Diesel STD ERR	No. 2 Fuel Oil	No. 2 Fuel Oil STD ERR	Wood Smoke	Wood Smoke STD ERR
11/2/11	12.8	1.5	0.3	0.6	0.2	0.0	0.0	0.0	0.0	3.0	1.1	7.6	1.5
11/5/11	7.5	0.9	0.1	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	6.9	0.8
11/8/11	12.7	1.1	0.2	0.4	0.1	0.0	0.0	0.0	0.0	2.4	0.8	8.3	1.3
11/11/11	14.0	1.1	0.1	0.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	11.1	1.1
11/14/11	17.8	1.8	0.3	0.7	0.2	0.0	0.0	0.0	0.0	4.5	1.3	10.4	1.3
11/17/11	38.1	2.9	0.5	1.1	0.4	0.0	0.0	0.0	0.0	11.9	2.1	21.0	3.2
11/20/11	30.4	3.1	0.6	0.8	0.4	0.0	0.0	0.0	0.0	13.8	2.4	11.7	2.1
11/23/11	12.6	1.6	0.3	0.6	0.2	0.0	0.0	0.0	0.0	3.8	1.2	7.6	1.1
11/26/11	31.9	2.1	0.4	0.9	0.3	0.0	0.0	0.0	0.0	8.0	1.5	18.9	2.3
11/29/11	22.3	2.7	0.5	0.8	0.4	0.0	0.0	0.0	0.0	7.5	2.0	11.4	1.8
12/2/11	12.8	1.7	0.2	0.9	0.2	0.0	0.0	0.0	0.0	0.0	0.0	10.3	0.9
12/5/11	5.1**	**	**	**	**	**	**	**	**	**	**	**	**
12/8/11	27.4	2.3	0.4	1.0	0.3	5.3	2.2	0.0	0.0	6.1	1.7	12.9	3.4
12/11/11	9.0	1.1	0.1	0.5	0.1	0.0	0.0	1.3	0.6	0.0	0.0	6.2	0.7
12/14/11	28.3	2.7	0.5	1.0	0.4	4.8	2.4	0.0	0.0	6.8	2.0	13.4	3.7
12/17/11	29.7	3.5	0.6	0.0	0.0	6.8	3.3	0.0	0.0	10.5	2.4	7.9	3.1
12/20/11	10.8	1.4	0.2	0.9	0.2	0.0	0.0	0.0	0.0	0.0	0.0	7.9	0.7
12/23/11	5.6**	**	**	**	**	**	**	**	**	**	**	**	**
12/26/11	24.9	2.2	0.4	0.9	0.3	0.0	0.0	0.0	0.0	9.2	1.6	14.5	2.4
12/29/11	23.6	2.3	0.4	0.9	0.3	0.0	0.0	0.0	0.0	9.2	1.7	11.8	1.7
1/1/12	28.0	2.6	0.4	1.1	0.4	0.0	0.0	0.0	0.0	3.9	1.8	19.5	2.6
1/4/12	33.6	1.2	0.2	0.8	0.2	0.0	0.0	0.0	0.0	3.3	0.9	15.3	1.8
1/7/12	14.6	1.8	0.3	0.6	0.2	0.0	0.0	0.0	0.0	5.5	1.4	7.9	1.3
1/10/12	19.6	2.4	0.4	0.7	0.3	0.0	0.0	2.5	0.9	6.2	1.8	9.9	1.6
1/13/12	19.0	2.6	0.4	0.0	0.0	0.0	0.0	0.0	0.0	8.7	1.8	6.5	1.6
1/16/12	26.4	3.0	0.5	1.3	0.4	0.0	0.0	0.0	0.0	9.7	2.2	11.7	2.0
1/19/12	38.0	3.7	0.7	2.6	0.5	0.0	0.0	0.0	0.0	14.7	2.8	14.4	2.5
1/22/12	3.3**	**	**	**	**	**	**	**	**	**	**	**	**
1/25/12	9.0	1.2	0.2	0.5	0.2	0.0	0.0	0.0	0.0	1.9	0.9	6.1	1.3
1/28/12	28.1	3.6	0.6	0.8	0.5	0.0	0.0	0.0	0.0	11.0	2.6	8.4	3.2
1/31/12	20.1	2.4	0.4	1.1	0.3	0.0	0.0	0.0	0.0	7.4	1.8	9.4	1.6
2/3/12	6.7	1.0	0.1	0.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	5.3	0.8
2/6/12	***	***	***	***	***	***	***	***	***	***	***	***	***
2/9/12	***	***	***	***	***	***	***	***	***	***	***	***	***
2/12/12	17.0	1.6	0.3	1.5	0.2	0.0	0.0	0.0	0.0	2.6	1.2	12.4	1.3
2/15/12	30.7	2.8	0.7	1.6	0.7	0.0	0.0	4.8	1.1	7.7	3.8	14.8	4.3
2/18/12	26.9	2.4	0.4	2.4	0.4	0.0	0.0	0.0	0.0	7.0	1.8	17.5	2.6
2/21/12	16.2	1.7	0.3	1.1	0.2	0.0	0.0	0.0	0.0	3.5	1.3	10.0	1.3
2/24/12	5.7**	**	**	**	**	**	**	**	**	**	**	**	**
2/27/12	3.6**	**	**	**	**	**	**	**	**	**	**	**	**
3/1/12	13.9	1.6	0.3	0.5	0.2	0.0	0.0	0.0	0.0	5.2	1.2	6.5	1.2
3/4/12	13.1	1.8	0.3	0.7	0.3	0.0	0.0	0.0	0.0	3.5	1.3	6.5	1.2
3/7/12	6.4	1.1	0.1	0.8	0.1	0.0	0.0	0.0	0.0	0.0	0.0	4.3	0.6
3/10/12	9.8	1.4	0.2	0.8	0.2	0.0	0.0	0.0	0.0	3.2	1.0	4.3	1.0

3/13/12	15.8	2.0	0.4	0.9	0.3	0.0	0.0	0.0	0.0	5.8	1.5	9.5	1.5
3/16/12	17.1	2.0	0.4	0.8	0.3	0.0	0.0	0.0	0.0	6.0	1.5	7.3	1.4
3/19/12	12.1	1.5	0.3	0.9	0.2	0.0	0.0	0.0	0.0	4.4	1.1	4.8	1.1
3/22/12	13.3	1.7	0.3	0.9	0.2	0.0	0.0	0.0	0.0	5.4	1.3	4.6	1.2
3/25/12	***	***	***	***	***	***	***	***	***	***	***	***	***
3/28/12	9.2	1.1	0.2	1.0	0.2	0.0	0.0	0.0	0.0	2.1	0.9	6.5	0.9
3/31/12	5.6**	**	**	**	**	**	**	**	**	**	**	**	**
Average	**19.3**	**2.0**	**0.4**	**0.9**	**0.3**	**0.4**	**0.2**	**0.2**	**0.1**	**5.4**	**1.4**	**10.1**	**1.7**

Notes: *No, incomplete, or invalid CMB data set. **Mass was too small to conduct a CMB analysis. ***Couldn't get a good statistical fit during CMB modeling.

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – EPA Profiles. NPF3 – Winter 2011/2012.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	Autos	Autos STD ERR	Diesel	Diesel STD ERR	Wood Smoke	Wood Smoke STD ERR
3/1/12	4.5**	**	**	**	**	**	**	**	**	**	**
3/4/12	37.4	2.7	0.3	1.1	0.3	0.0	0.0	3.3	1.2	29.7	3.7
3/7/12	6.1	0.7	0.1	0.3	0.1	0.0	0.0	1.8	0.7	3.5	0.7
3/10/12	20.5	1.9	0.2	0.8	0.2	0.0	0.0	0.0	0.0	16.9	2.0
3/13/12	5.1**	**	**	**	**	**	**	**	**	**	**
3/16/12	7.5	1.1	0.1	0.5	0.1	0.0	0.0	0.0	0.0	5.9	0.9
3/19/12	27.8	2.5	0.3	0.9	0.3	5.4	2.5	0.0	0.0	18.3	2.4
3/22/12	15.2	1.9	0.2	0.7	0.3	0.0	0.0	1.3	0.6	12.5	1.7
3/25/12	13.6	1.1	0.1	0.6	0.1	0.0	0.0	0.0	0.0	12.7	2.6
3/28/12	5.2**	**	**	**	**	**	**	**	**	**	**
3/31/12	4.8**	**	**	**	**	**	**	**	**	**	**
Average	**18.3**	**1.7**	**0.2**	**0.7**	**0.2**	**0.8**	**0.4**	**0.9**	**0.4**	**14.2**	**2.0**

Notes: *No, incomplete, or invalid CMB data set. **Mass was too small to conduct a CMB analysis.

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – OMNI Profiles. NPF3 – Winter 2011/2012.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	No. 2 Fuel Oil	No. 2 Fuel Oil STD ERR	Wood Smoke	Wood Smoke STD ERR
3/1/12	4.5**	**	**	**	**	**	**	**	**
3/4/12	37.4	2.0	0.3	0.6	0.3	3.9	1.4	27.8	2.0
3/7/12	6.1	0.6	0.1	0.3	0.1	0.0	0.0	4.8	0.6
3/10/12	20.5	1.5	0.3	0.5	0.2	2.2	1.1	14.8	1.3
3/13/12	5.1**	**	**	**	**	**	**	**	**
3/16/12	7.5	0.8	0.1	0.4	0.1	1.5	0.6	4.9	1.0
3/19/12	27.8	1.4	0.2	0.6	0.2	4.3	1.0	25.4	2.2
3/22/12	15.2	1.1	0.2	0.5	0.2	3.5	0.8	11.0	1.1
3/25/12	13.6	1.1	0.1	0.6	0.1	0.0	0.0	10.0	0.8
3/28/12	5.2**	**	**	**	**	**	**	**	**
3/31/12	4.8**	**	**	**	**	**	**	**	**
Average	**18.3**	**1.2**	**0.2**	**0.5**	**0.2**	**2.2**	**0.7**	**14.1**	**1.3**

Notes: *No, incomplete, or invalid CMB data set. **Mass was too small to conduct a CMB analysis.

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – EPA Profiles.
State Building – Summer 2012.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	Autos	Autos STD ERR	Diesel	Diesel STD ERR	Street Sand	Street Sand STD ERR	Wood Smoke	Wood Smoke STD ERR
6/2/12	***	***	***	***	***	***	***	***	***	***	***	***	***
6/5/12	4.8	0.5	0.1	0.4	0.1	1.5	0.3	0.0	0.0	0.5	0.2	1.6	0.2
6/8/12	6.0	0.5	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	5.4	0.3
6/11/12	5.9	0.5	0.1	0.3	0.1	0.0	0.0	0.0	0.0	0.6	0.2	4.5	0.1
6/14/12	4.6	0.4	0.0	0.2	0.0	0.5	0.2	0.0	0.0	0.0	0.0	2.5	0.2
6/17/12	3.8	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.3	0.1	2.8	0.1
6/20/12	8.6	0.4	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.9	0.2	6.0	0.1
6/23/12	6.4	0.4	0.1	0.3	0.1	0.0	0.0	0.0	0.0	0.6	0.2	5.1	0.3
6/26/12	3.2	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	0.1
6/29/12	3.7	0.4	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.1
7/2/12	***	***	***	***	***	***	***	***	***	***	***	***	***
7/5/12	4.3	0.3	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.1
7/8/12	***	***	***	***	***	***	***	***	***	***	***	***	***
7/11/12	3.7	0.3	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	0.1
7/14/12	***	***	***	***	***	***	***	***	***	***	***	***	***
7/17/12	*	*	*	*	*	*	*	*	*	*	*	*	*
7/20/12	3.6	0.6	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.2
7/23/12	***	***	***	***	***	***	***	***	***	***	***	***	***
7/26/12	8.1	0.8	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	5.3	0.2
7/29/12	3.9	0.4	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	3.2	0.2
8/1/12	3.6	0.2	0.0	0.1	0.0	0.7	0.1	0.0	0.0	1.1	0.1	1.4	0.2
8/4/12	***	***	***	***	***	***	***	***	***	***	***	***	***
8/7/12	4.2	0.4	0.0	0.2	0.0	1.3	0.2	0.0	0.0	0.0	0.0	2.3	0.2
8/10/12	4.6	0.3	0.0	0.2	0.0	0.5	0.2	0.0	0.0	0.3	0.1	3.7	0.3
8/13/12	7.7	0.6	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.7	0.3	5.9	0.1
8/16/12	***	***	***	***	***	***	***	***	***	***	***	***	***
8/19/12	20.2	0.5	0.1	0.8	0.1	0.0	0.0	0.0	0.0	0.0	0.0	18.6	0.1
8/22/12	***	***	***	***	***	***	***	***	***	***	***	***	***
8/25/12	3.2	0.3	0.0	0.2	0.0	0.0	0.0	0.2	0.1	0.0	0.0	2.6	0.1
8/28/12	***	***	***	***	***	***	***	***	***	***	***	***	***
8/31/12	***	***	***	***	***	***	***	***	***	***	***	***	***
Average	**5.7**	**0.4**	**0.1**	**0.2**	**0.1**	**0.2**	**0.1**	**0.1**	**0.003**	**0.3**	**0.1**	**4.2**	**0.2**

Notes: *No, incomplete, or invalid CMB data set. **Mass was too small to conduct a CMB analysis. ***Couldn't get a good statistical fit during CMB modeling.

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – OMNI Profiles. State Building – Summer 2012.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	Autos	Autos STD ERR	Diesel	Diesel STD ERR	Street Sand	Street Sand STD ERR	Wood Smoke	Wood Smoke STD ERR
6/2/12	***	***	***	***	***	***	***	***	***	***	***	***	***
6/5/12	4.8	0.4	0.1	0.4	0.1	0.0	0.0	0.3	0.1	0.5	0.2	3.2	0.1
6/8/12	6.0	0.4	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	5.0	0.1
6/11/12	5.9	0.4	0.1	0.3	0.1	0.0	0.0	0.0	0.0	0.6	0.2	3.6	0.1
6/14/12	4.6	0.3	0.0	0.2	0.0	0.7	0.2	0.0	0.0	0.0	0.0	1.9	0.1
6/17/12	3.8	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.3	0.1	2.2	0.0
6/20/12	8.6	0.4	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.9	0.2	4.8	0.1
6/23/12	6.4	0.4	0.0	0.3	0.1	0.0	0.0	0.0	0.0	0.6	0.2	4.7	0.1
6/26/12	3.2	0.2	0.0	0.1	0.0	0.4	0.1	0.0	0.0	0.0	0.0	2.2	0.1
6/29/12	3.7	0.3	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.1
7/2/12	***	***	***	***	***	***	***	***	***	***	***	***	***
7/5/12	4.3	0.3	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.1
7/8/12	***	***	***	***	***	***	***	***	***	***	***	***	***
7/11/12	3.7	0.3	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1	0.1
7/14/12	***	***	***	***	***	***	***	***	***	***	***	***	***
7/17/12	*	*	*	*	*	*	*	*	*	*	*	*	*
7/20/12	3.6	0.6	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	0.1
7/23/12	***	***	***	***	***	***	***	***	***	***	***	***	***
7/26/12	8.1	0.7	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	4.2	0.2
7/29/12	3.9	0.4	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.1
8/1/12	3.6	0.2	0.0	0.1	0.0	0.0	0.0	0.2	0.0	1.2	0.2	2.0	0.1
8/4/12	***	***	***	***	***	***	***	***	***	***	***	***	***
8/7/12	4.2	0.4	0.0	0.1	0.0	1.5	0.2	0.0	0.0	0.0	0.0	1.8	0.1
8/10/12	4.6	0.3	0.0	0.2	0.0	0.8	0.2	0.0	0.0	0.3	0.1	3.1	0.1
8/13/12	7.7	0.5	0.1	0.2	0.1	0.9	0.3	0.0	0.0	0.7	0.2	4.3	0.2
8/16/12	***	***	***	***	***	***	***	***	***	***	***	***	***
8/19/12	20.2	0.4	0.1	0.8	0.1	0.0	0.0	0.0	0.0	0.0	0.0	15.0	0.1
8/22/12	***	***	***	***	***	***	***	***	***	***	***	***	***
8/25/12	3.2	0.2	0.0	0.2	0.0	0.8	0.2	0.0	0.0	0.0	0.0	1.9	0.1
8/28/12	***	***	***	***	***	***	***	***	***	***	***	***	***
8/31/12	***	***	***	***	***	***	***	***	***	***	***	***	***
Average	**5.7**	**0.4**	**0.05**	**0.2**	**0.05**	**0.3**	**0.1**	**0.02**	**0.01**	**0.3**	**0.1**	**3.6**	**0.1**

Notes: *No, incomplete, or invalid CMB data set. **Mass was too small to conduct a CMB analysis. ***Couldn't get a good statistical fit during CMB modeling.

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – EPA Profiles. NCORE – Summer 2012.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	Autos	Autos STD ERR	Diesel	Diesel STD ERR	Street Sand	Street Sand STD ERR	Wood Smoke	Wood Smoke STD ERR
6/14/12	2.9	0.2	0.0	0.1	0.3	0.0	0.0	2.2	0.5	0.2	0.1	0.0	0.0
6/17/12	4.3	0.2	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.4	0.1	3.7	0.4
6/20/12	5.9	0.5	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.4	0.1	5.1	0.5
6/23/12	6.6	0.3	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.8	0.1	5.9	1.0
6/26/12	***	***	***	***	***	***	***	***	***	***	***	***	***
6/29/12	3.1	0.3	0.0	0.0	0.0	0.0	0.0	2.8	0.5	0.0	0.0	0.0	0.0
7/2/12	4.3	0.3	0.0	0.3	0.1	4.2	0.4	0.0	0.0	0.0	0.0	0.0	0.0
7/5/12	***	***	***	***	***	***	***	***	***	***	***	***	***
7/8/12	***	***	***	***	***	***	***	***	***	***	***	***	***
7/11/12	***	***	***	***	***	***	***	***	***	***	***	***	***
7/14/12	***	***	***	***	***	***	***	***	***	***	***	***	***
7/17/12	***	***	***	***	***	***	***	***	***	***	***	***	***
7/20/12	3.4	0.6	0.1	0.3	0.1	2.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0
7/23/12	***	***	***	***	***	***	***	***	***	***	***	***	***
7/26/12	5.9	0.8	0.1	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	5.2	0.5
7/29/12	4.2	0.4	0.0	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	4.5	0.6
8/1/12	4.0	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	1.3	0.2	3.4	0.4
8/4/12	3.2	0.3	0.1	0.2	0.0	3.4	0.6	0.0	0.0	0.0	0.0	0.0	0.0
8/7/12	4.5	0.4	0.0	0.2	0.1	3.8	0.6	0.0	0.0	0.0	0.0	0.0	0.0
8/10/12	4.3	0.3	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.1	4.2	0.6
8/13/12	6.5	0.5	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.4	0.1	5.1	0.5
8/16/12	4.2	0.5	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	3.9	0.6
8/19/12	15.6	0.5	0.1	0.7	0.1	0.0	0.0	0.0	0.0	0.3	0.1	15.3	1.8
8/22/12	4.3	0.2	0.1	0.2	0.0	3.5	0.7	0.0	0.0	0.6	0.1	0.0	0.0
8/25/12	*	*	*	*	*	*	*	*	*	*	*	*	*
8/28/12	***	***	***	***	***	***	***	***	***	***	***	***	***
8/31/12	***	***	***	***	***	***	***	***	***	***	***	***	***
Average	**5.1**	**0.4**	**0.1**	**0.2**	**0.1**	**1.0**	**0.2**	**0.3**	**0.1**	**0.3**	**0.1**	**3.3**	**0.4**

Notes: *No, incomplete, or invalid CMB data set. **Mass was too small to conduct a CMB analysis. ***Couldn't get a good statistical fit during CMB modeling.

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – OMNI Profiles. NCORE – Summer 2012.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	Autos	Autos STD ERR	Diesel	Diesel STD ERR	Street Sand	Street Sand STD ERR	Wood Smoke	Wood Smoke STD ERR
6/14/12	2.9	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	2.8	0.4
6/17/12	4.3	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.3	0.1	4.2	0.4
6/20/12	5.9	0.4	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.4	0.1	5.7	0.5
6/23/12	6.6	0.3	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.8	0.1	6.6	0.7
6/26/12	***	***	***	***	***	***	***	***	***	***	***	***	***
6/29/12	3.1	0.3	0.0	0.0	0.0	0.0	0.0	2.8	0.5	0.0	0.0	0.0	0.0
7/2/12	4.3	0.3	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.4	0.4
7/5/12	***	***	***	***	***	***	***	***	***	***	***	***	***
7/8/12	***	***	***	***	***	***	***	***	***	***	***	***	***
7/11/12	***	***	***	***	***	***	***	***	***	***	***	***	***
7/14/12	***	***	***	***	***	***	***	***	***	***	***	***	***
7/17/12	***	***	***	***	***	***	***	***	***	***	***	***	***
7/20/12	3.4	0.6	0.1	0.3	0.1	2.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0
7/23/12	***	***	***	***	***	***	***	***	***	***	***	***	***
7/26/12	5.9	0.8	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	5.9	0.4
7/29/12	4.2	0.3	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.5	0.6
8/1/12	4.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.7	0.1	3.2	0.3
8/4/12	3.2	0.3	0.1	0.2	0.0	3.4	0.6	0.0	0.0	0.0	0.0	0.0	0.0
8/7/12	4.5	0.4	0.0	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	3.6	0.5
8/10/12	4.3	0.3	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.1	3.9	0.5
8/13/12	6.5	0.4	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.5	0.2	5.6	0.4
8/16/12	4.2	0.5	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	4.2	0.5
8/19/12	15.6	0.5	0.1	0.6	0.1	0.0	0.0	0.0	0.0	0.4	0.1	14.3	1.0
8/22/12	4.3	0.2	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.5	0.1	3.5	0.5
8/25/12	*	*	*	*	*	*	*	*	*	*	*	*	*
8/28/12	***	***	***	***	***	***	***	***	***	***	***	***	***
8/31/12	***	***	***	***	***	***	***	***	***	***	***	***	***
Average	**5.1**	**0.4**	**0.05**	**0.2**	**0.05**	**0.3**	**0.1**	**0.2**	**0.03**	**0.2**	**0.1**	**4.2**	**0.4**

Notes: *No, incomplete, or invalid CMB data set. **Mass was too small to conduct a CMB analysis. ***Couldn't get a good statistical fit during CMB modeling.

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – EPA Profiles. State Building – Winter 2012/2013.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	Autos	Autos STD ERR	Diesel	Diesel STD ERR	Wood Smoke	Wood Smoke STD ERR
11/2/12	14.9	2.2	0.3	1.0	0.3	0.0	0.0	0.0	0.0	10.8	0.4
11/5/12	19.7	3.6	0.4	1.7	0.5	0.0	0.0	0.0	0.0	14.6	1.2
11/8/12	34.9	6.3	0.8	2.6	0.8	0.0	0.0	0.0	0.0	26.1	1.2
11/11/12	13.8	1.9	0.2	0.8	0.2	0.0	0.0	0.0	0.0	10.5	0.7
11/14/12	22.2	3.4	0.4	1.6	0.4	0.0	0.0	0.0	0.0	16.7	0.6
11/17/12	3.3**	**	**	**	**	**	**	**	**	**	**
11/20/12	27.4	5.7	0.7	1.9	0.7	0.0	0.0	0.0	0.0	19.9	1.8
11/23/12	19.3	3.7	0.5	1.4	0.5	0.0	0.0	1.6	0.7	12.8	0.8
11/26/12	52.0	10.6	1.3	3.4	1.3	0.0	0.0	12.0	4.8	24.5	6.0
11/29/12	*	*	*	*	*	*	*	*	*	*	*
12/2/12	31.0	5.1	0.6	2.3	0.7	0.0	0.0	0.0	0.0	24.0	4.7
12/5/12	***	***	***	***	***	***	***	***	***	***	***
12/8/12	22.6	4.7	0.6	1.2	0.6	0.0	0.0	0.0	0.0	17.7	3.5
12/11/12	5.8**	**	**	**	**	**	**	**	**	**	**
12/14/12	10.6	1.9	0.2	0.8	0.2	0.0	0.0	1.7	0.5	7.1	0.8
12/17/12	***	***	***	***	***	***	***	***	***	***	***
12/20/12	***	***	***	***	***	***	***	***	***	***	***
12/23/12	***	***	***	***	***	***	***	***	***	***	***
12/26/12	***	***	***	***	***	***	***	***	***	***	***
12/29/12	26.9	4.1	0.5	2.3	0.5	0.0	0.0	5.4	0.8	14.6	1.2
1/1/13	7.0	0.9	0.1	0.8	0.1	0.0	0.0	0.0	0.0	5.4	1.0
1/4/13	24.4	3.3	0.4	1.4	0.4	0.0	0.0	5.9	0.6	13.4	0.7
1/7/13	29.1	5.4	0.7	1.7	0.7	0.0	0.0	2.7	1.0	20.0	1.1
1/10/13	***	***	***	***	***	***	***	***	***	***	***
1/13/13	***	***	***	***	***	***	***	***	***	***	***
1/16/13	*	*	*	*	*	*	*	*	*	*	*
1/19/13	21.5	4.7	0.6	1.7	0.6	0.0	0.0	0.0	0.0	14.3	2.2
1/22/13	22.2	4.3	0.5	1.6	0.6	0.0	0.0	0.0	0.0	15.9	2.3
1/25/13	***	***	***	***	***	***	***	***	***	***	***
1/28/13	41.4	9.1	1.1	2.7	1.1	0.0	0.0	0.0	0.0	28.3	2.3
1/31/13	***	***	***	***	***	***	***	***	***	***	***
2/3/13	23.1	3.6	0.5	1.9	0.5	0.0	0.0	0.0	0.0	17.8	1.0
2/6/13	18.0	3.3	0.4	2.4	0.4	0.0	0.0	0.0	0.0	13.0	0.9
2/9/13	*	*	*	*	*	*	*	*	*	*	*
2/12/13	27.0	4.7	0.6	2.5	0.6	0.0	0.0	3.9	1.7	14.4	2.6
2/15/13	***	***	***	***	***	***	***	***	***	***	***
2/18/13	17.8	4.0	0.5	1.8	0.5	0.0	0.0	0.0	0.0	12.2	0.8
2/21/13	3.8**	**	**	**	**	**	**	**	**	**	**
2/24/13	16.1	2.2	0.3	1.3	0.3	0.0	0.0	0.0	0.0	13.1	0.6
2/27/13	18.2	2.8	0.4	1.5	0.4	0.0	0.0	1.2	0.5	11.9	0.6
3/2/13	17.1	2.6	0.3	2.0	0.4	0.0	0.0	0.0	0.0	11.7	1.7
3/5/13	*	*	*	*	*	*	*	*	*	*	*
3/8/13	14.6	1.9	0.2	1.3	0.3	0.0	0.0	0.0	0.0	11.4	0.7
3/11/13	16.6	3.2	0.4	1.9	0.4	0.0	0.0	0.0	0.0	11.2	2.2

3/14/13	*	*	*	*	*	*	*	*	*	*	*
3/17/13	10.7	2.1	0.3	1.2	0.3	3.0	1.2	0.0	0.0	4.3	0.6
3/20/13	*	*	*	*	*	*	*	*	*	*	*
3/23/13	*	*	*	*	*	*	*	*	*	*	*
3/26/13	4.8**	**	**	**	**	**	**	**	**	**	**
3/29/13	12.2	1.4	0.2	1.3	0.2	0.0	0.0	0.0	0.0	9.5	0.4
Average	**21.8**	**3.9**	**0.5**	**1.7**	**0.5**	**0.1**	**0.04**	**1.2**	**0.4**	**14.7**	**1.5**

Notes: *No, incomplete, or invalid CMB data set. **Mass was too small to conduct a CMB analysis. ***Couldn't get a good statistical fit during CMB modeling.

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – OMNI Profiles. State Building – Winter 2012/2013.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	Autos	Autos STD ERR	Diesel	Diesel STD ERR	No. 2 Fuel Oil	No. 2 Fuel Oil STD ERR	Wood Smoke	Wood Smoke STD ERR
11/2/12	14.9	1.6	0.3	0.8	0.2	0.0	0.0	0.8	0.3	2.8	1.1	8.4	1.3
11/5/12	19.7	2.2	0.4	1.2	0.3	0.0	0.0	0.0	0.0	7.1	1.6	8.8	1.8
11/8/12	34.9	3.7	0.7	1.7	0.5	0.0	0.0	0.0	0.0	13.9	2.8	13.3	3.1
11/11/12	13.8	1.4	0.3	0.6	0.2	0.0	0.0	0.0	0.0	2.7	1.0	6.7	1.1
11/14/12	22.2	2.1	0.4	1.2	0.3	0.0	0.0	0.0	0.0	6.9	1.5	10.7	1.7
11/17/12	3.3**	**	**	**	**	**	**	**	**	**	**	**	**
11/20/12	27.4	3.3	0.7	1.0	0.5	0.0	0.0	0.0	0.0	12.8	2.5	8.8	2.8
11/23/12	19.3	2.4	0.5	0.9	0.3	0.0	0.0	1.3	0.5	7.1	1.8	6.5	2.0
11/26/12	52.0	10.2	1.3	3.5	1.3	0.0	0.0	0.0	0.0	0.0	0.0	32.0	2.1
11/29/12	*	*	*	*	*	*	*	*	*	*	*	*	*
12/2/12	31.0	2.8	0.6	1.4	0.4	0.0	0.0	0.0	0.0	11.8	2.2	17.7	2.4
12/5/12	***	***	***	***	***	***	***	***	***	***	***	***	***
12/8/12	22.6	2.8	0.6	0.5	0.4	0.0	0.0	0.0	0.0	9.9	2.1	7.4	1.6
12/11/12	5.8**	**	**	**	**	**	**	**	**	**	**	**	**
12/14/12	10.6	1.3	0.2	0.6	0.2	2.3	1.1	0.0	0.0	2.7	1.0	3.6	0.9
12/17/12	***	***	***	***	***	***	***	***	***	***	***	***	***
12/20/12	***	***	***	***	***	***	***	***	***	***	***	***	***
12/23/12	***	***	***	***	***	***	***	***	***	***	***	***	***
12/26/12	***	***	***	***	***	***	***	***	***	***	***	***	***
12/29/12	26.9	3.1	0.6	1.7	0.4	0.0	0.0	0.0	0.0	8.2	2.3	5.3	2.6
1/1/13	7.0	0.9	0.1	0.7	0.1	1.8	0.6	0.0	0.0	0.0	0.0	3.9	0.3
1/4/13	24.4	2.6	0.5	1.0	0.4	0.0	0.0	0.0	0.0	6.5	1.8	10.3	2.0
1/7/13	29.1	3.3	0.7	0.9	0.4	0.0	0.0	2.3	0.6	12.0	2.5	9.1	2.7
1/10/13	***	***	***	***	***	***	***	***	***	***	***	***	***
1/13/13	***	***	***	***	***	***	***	***	***	***	***	***	***
1/16/13	*	*	*	*	*	*	*	*	*	*	*	*	*
1/19/13	21.5	3.0	0.6	1.1	0.4	0.0	0.0	0.0	0.0	9.1	2.2	4.7	2.5
1/22/13	22.2	2.8	0.5	1.1	0.4	0.0	0.0	0.0	0.0	8.1	2.0	7.3	2.3
1/25/13	***	***	***	***	***	***	***	***	***	***	***	***	***
1/28/13	41.4	8.9	1.1	2.6	1.1	0.0	0.0	0.0	0.0	0.0	0.0	22.8	1.8
1/31/13	***	***	***	***	***	***	***	***	***	***	***	***	***
2/3/13	23.1	3.2	0.6	1.4	0.4	0.0	0.0	0.0	0.0	7.4	2.3	6.0	2.6
2/6/13	18.0	3.7	0.5	2.3	0.5	0.0	0.0	1.4	0.7	0.0	0.0	9.4	0.9
2/9/13	*	*	*	*	*	*	*	*	*	*	*	*	*
2/12/13	27.0	3.5	0.7	2.0	0.5	0.0	0.0	0.0	0.0	8.4	2.6	6.7	2.9
2/15/13	***	***	***	***	***	***	***	***	***	***	***	***	***
2/18/13	17.8	2.6	0.5	1.3	0.4	0.0	0.0	0.0	0.0	7.9	1.9	4.8	2.1
2/21/13	3.8**	**	**	**	**	**	**	**	**	**	**	**	**
2/24/13	16.1	2.0	0.4	1.0	0.3	0.0	0.0	0.0	0.0	4.2	1.5	5.8	1.6
2/27/13	18.2	2.1	0.4	1.3	0.3	3.9	1.4	0.0	0.0	4.0	1.6	7.5	1.7
3/2/13	17.1	1.9	0.4	1.8	0.3	2.6	1.3	0.0	0.0	3.3	1.5	6.8	1.6
3/5/13	*	*	*	*	*	*	*	*	*	*	*	*	*
3/8/13	14.6	1.3	0.3	1.1	0.2	0.0	0.0	0.0	0.0	3.0	1.0	6.7	1.1
3/11/13	16.6	2.2	0.4	1.5	0.3	0.0	0.0	0.0	0.0	5.7	1.6	4.4	1.8

3/14/13	*	*	*	*	*	*	*	*	*	*	*	*	*
3/17/13	10.7	1.2	0.2	0.9	0.2	0.0	0.0	0.0	0.0	4.5	1.0	3.7	1.1
3/20/13	*	*	*	*	*	*	*	*	*	*	*	*	*
3/23/13	*	*	*	*	*	*	*	*	*	*	*	*	*
3/26/13	4.8**	**	**	**	**	**	**	**	**	**	**	**	**
3/29/13	12.2	1.2	0.2	1.0	0.2	1.9	0.8	0.0	0.0	3.4	1.0	2.8	1.0
Average	**21.8**	**2.9**	**0.5**	**1.3**	**0.4**	**0.4**	**0.2**	**0.2**	**0.1**	**6.0**	**1.5**	**8.7**	**1.8**

Notes: *No, incomplete, or invalid CMB data set. **Mass was too small to conduct a CMB analysis. ***Couldn't get a good statistical fit during CMB modeling.

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – EPA Profiles. NPE – Winter 2012/2013.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	Autos	Autos STD ERR	Diesel	Diesel STD ERR	Wood Smoke	Wood Smoke STD ERR
11/2/12	30.0	2.6	0.3	0.8	0.3	0.0	0.0	7.2	1.0	16.8	2.2
11/5/12	23.9	1.6	0.2	0.9	0.2	8.2	1.7	0.0	0.0	15.1	2.0
11/8/12	51.2	3.2	0.4	1.0	0.4	0.0	0.0	4.0	1.0	45.1	2.8
11/11/12	17.4	1.4	0.2	0.6	0.2	5.9	1.4	0.0	0.0	10.5	1.4
11/14/12	14.9	0.9	0.1	0.5	0.1	0.0	0.0	0.0	0.0	13.5	2.0
11/17/12	7.3	0.5	0.1	0.2	0.1	0.0	0.0	0.0	0.0	5.1	0.6
11/20/12	21.8	3.0	0.3	0.8	0.4	0.0	0.0	4.9	1.0	12.3	1.6
11/23/12	5.3**	**	**	**	**	**	**	**	**	**	**
11/26/12	75.2	6.3	0.7	1.8	0.8	0.0	0.0	12.4	2.1	46.9	5.7
11/29/12	68.1	6.2	0.7	1.9	0.8	0.0	0.0	11.6	2.0	44.3	5.4
12/2/12	51.7	4.0	0.4	1.2	0.5	0.0	0.0	10.7	1.5	30.1	3.7
12/5/12	32.7	2.8	0.3	1.7	0.4	0.0	0.0	9.0	1.2	20.6	2.6
12/8/12	56.8	6.9	0.8	1.8	0.9	0.0	0.0	6.9	1.5	37.4	4.5
12/11/12	5.5**	**	**	**	**	**	**	**	**	**	**
12/14/12	7.0	0.6	0.1	0.5	0.1	0.0	0.0	0.7	0.3	5.5	0.7
12/17/12	37.3	3.5	0.4	1.0	0.4	0.0	0.0	6.1	0.9	29.0	3.4
12/20/12	47.3	4.2	0.5	1.1	0.5	0.0	0.0	5.9	1.1	35.9	4.2
12/23/12	62.4	5.8	0.7	1.8	0.7	0.0	0.0	7.3	1.4	46.7	5.5
12/26/12	40.2	2.0	0.2	2.5	0.3	0.0	0.0	5.3	0.8	31.8	3.7
12/29/12	31.5	2.6	0.3	1.0	0.3	0.0	0.0	6.0	1.0	21.4	2.7
1/1/13	10.0	0.8	0.1	0.4	0.1	0.0	0.0	0.0	0.0	9.4	1.0
1/4/13	47.7	3.1	0.3	1.2	0.4	0.0	0.0	8.3	1.2	28.9	3.5
1/7/13	38.3	3.4	0.4	1.3	0.4	0.0	0.0	4.3	1.1	25.9	3.2
1/10/13	17.8	1.9	0.2	0.9	0.2	5.3	1.6	0.0	0.0	10.1	1.4
1/13/13	14.9	1.1	0.1	0.6	0.1	4.6	1.2	0.0	0.0	8.2	1.1
1/16/13	19.8	2.0	0.2	1.0	0.3	0.0	0.0	0.0	0.0	17.7	3.6
1/19/13	5.8**	**	**	**	**	**	**	**	**	**	**
1/22/13	4.4**	**	**	**	**	**	**	**	**	**	**
1/25/13	26.8	4.2	0.5	1.4	0.5	0.0	0.0	2.7	0.9	18.8	2.3
1/28/13	39.9	4.8	0.5	1.5	0.6	0.0	0.0	6.1	1.5	26.6	3.3
1/31/13	22.3	2.0	0.2	1.0	0.3	0.0	0.0	0.0	0.0	19.8	1.8
2/3/13	11.0	1.3	0.1	1.3	0.2	0.0	0.0	0.0	0.0	8.7	1.1
2/6/13	15.2	2.3	0.3	1.4	0.3	0.0	0.0	0.0	0.0	11.4	2.9
2/9/13	23.6	1.9	0.2	0.7	0.2	0.0	0.0	0.0	0.0	22.6	1.8
2/12/13	41.6	2.9	0.3	1.8	0.4	6.1	2.8	0.0	0.0	31.0	3.9
2/15/13	11.1	0.8	0.1	0.6	0.1	0.0	0.0	0.0	0.0	6.5	1.0
2/18/13	16.0	2.0	0.2	0.9	0.3	0.0	0.0	0.0	0.0	13.4	1.6
2/21/13	3.4**	**	**	**	**	**	**	**	**	**	**
2/24/13	13.9	1.6	0.2	0.7	0.2	0.0	0.0	0.0	0.0	11.2	1.0
2/27/13	20.3	1.4	0.2	1.0	0.2	0.0	0.0	2.0	0.9	15.7	2.0
3/2/13	23.6	1.8	0.2	1.5	0.2	0.0	0.0	1.1	0.5	25.6	3.0
3/5/13	*	*	*	*	*	*	*	*	*	*	*
3/8/13	12.4	0.9	0.1	0.7	0.2	0.0	0.0	1.2	0.4	9.8	1.2

3/11/13	14.4	1.6	0.2	1.0	0.2	0.0	0.0	0.0	0.0	13.0	1.6
3/14/13	2.6**	**	**	**	**	**	**	**	**	**	**
3/17/13	15.5	1.3	0.1	0.8	0.2	0.0	0.0	1.0	0.4	13.0	1.6
3/20/13	1.0**	**	**	**	**	**	**	**	**	**	**
3/23/13	4.6**	**	**	**	**	**	**	**	**	**	**
3/26/13	6.2	0.8	0.1	0.3	0.1	0.0	0.0	0.0	0.0	4.4	0.9
3/29/13	11.8	1.0	0.1	0.7	0.1	0.0	0.0	0.0	0.0	10.8	1.4
Average	**28.1**	**2.5**	**0.3**	**1.1**	**0.3**	**0.7**	**0.2**	**3.0**	**0.6**	**20.3**	**2.5**

Notes: *No, incomplete, or invalid CMB data set. **Mass was too small to conduct a CMB analysis. ***Couldn't get a good statistical fit during CMB modeling.

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – OMNI Profiles. NPE – Winter 2012/2013.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	Autos	Autos STD ERR	Diesel	Diesel STD ERR	No. 2 Fuel Oil	No. 2 Fuel Oil STD ERR	Wood Smoke	Wood Smoke STD ERR
11/2/12	30.0	0.9	0.4	0.0	0.0	3.4	0.7	0.0	0.0	7.9	2.0	19.1	2.2
11/5/12	23.9	0.6	0.1	0.6	0.1	0.0	0.0	1.7	0.4	3.0	0.5	19.2	1.5
11/8/12	51.2	1.9	0.4	0.5	0.3	0.0	0.0	7.9	1.2	6.9	1.4	35.0	3.1
11/11/12	17.4	0.7	0.2	0.4	0.2	0.0	0.0	1.0	0.4	2.9	0.9	14.3	1.4
11/14/12	14.9	0.5	0.1	0.4	0.1	0.0	0.0	0.0	0.0	1.5	0.4	10.9	0.9
11/17/12	7.3	0.3	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.7	0.3	3.1	0.5
11/20/12	21.8	2.0	0.3	0.0	0.0	5.3	2.2	0.0	0.0	5.5	1.4	9.8	1.5
11/23/12	5.3**	**	**	**	**	**	**	**	**	**	**	**	**
11/26/12	75.2	2.3	0.7	0.0	0.0	0.0	0.0	4.7	1.1	17.8	3.3	55.4	5.1
11/29/12	68.1	1.6	0.7	0.0	0.0	0.0	0.0	5.2	1.1	22.5	3.4	43.1	4.3
12/2/12	51.7	2.0	0.4	0.0	0.0	13.4	2.4	0.0	0.0	8.9	1.4	34.0	4.7
12/5/12	32.7	1.8	0.3	1.2	0.3	0.0	0.0	4.7	1.1	5.3	1.4	19.7	1.9
12/8/12	56.8	4.5	0.8	0.0	0.0	0.0	0.0	0.0	0.0	15.9	3.1	31.2	3.0
12/11/12	5.5**	**	**	**	**	**	**	**	**	**	**	**	**
12/14/12	7.0	0.6	0.1	0.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	6.1	0.4
12/17/12	37.3	2.3	0.5	0.0	0.0	0.0	0.0	1.7	0.8	8.4	2.0	25.2	2.4
12/20/12	47.3	2.8	0.5	0.0	0.0	0.0	0.0	0.0	0.0	10.0	1.9	33.0	2.3
12/23/12	62.4	3.6	0.7	0.0	0.0	0.0	0.0	0.0	0.0	14.7	2.5	41.4	3.0
12/26/12	40.2	**	**	**	**	**	**	**	**	**	**	**	**
12/29/12	31.5	1.8	0.3	0.9	0.3	0.0	0.0	0.0	0.0	3.5	1.4	23.4	1.6
1/1/13	10.0	0.7	0.1	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	9.5	0.8
1/4/13	47.7	1.3	0.3	0.8	0.2	0.0	0.0	4.2	0.7	5.4	1.0	37.2	2.5
1/7/13	38.3	2.3	0.4	0.7	0.3	0.0	0.0	0.0	0.0	5.8	1.7	24.2	1.8
1/10/13	17.8	1.0	0.2	0.6	0.2	1.4	0.7	0.0	0.0	3.4	1.2	12.9	1.7
1/13/13	14.9	0.8	0.1	0.6	0.2	1.6	0.6	0.0	0.0	0.0	0.0	12.9	1.2
1/16/13	19.8	1.4	0.2	0.8	0.2	0.0	0.0	0.0	0.0	2.7	1.0	11.8	1.2
1/19/13	5.8**	**	**	**	**	**	**	**	**	**	**	**	**
1/22/13	4.4**	**	**	**	**	**	**	**	**	**	**	**	**
1/25/13	26.8	2.7	0.5	0.7	0.4	0.0	0.0	0.0	0.0	8.6	2.0	14.3	1.8
1/28/13	39.9	2.4	0.5	0.7	0.3	0.0	0.0	0.0	0.0	11.8	1.8	21.2	1.9
1/31/13	22.3	1.2	0.2	0.8	0.2	2.9	1.2	0.0	0.0	3.1	0.9	15.3	2.1
2/3/13	11.0	1.3	0.1	1.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	8.7	0.7
2/6/13	15.2	1.4	0.3	1.2	0.2	0.0	0.0	0.0	0.0	4.1	1.1	7.1	1.1
2/9/13	23.6	1.7	0.2	0.6	0.2	0.0	0.0	0.0	0.0	0.0	0.0	18.1	1.4
2/12/13	41.6	2.0	0.4	1.3	0.3	0.0	0.0	0.0	0.0	4.7	1.5	28.0	2.1
2/15/13	11.1	0.8	0.1	0.6	0.1	0.0	0.0	0.0	0.0	0.0	0.0	5.2	0.7
2/18/13	16.0	1.5	0.3	0.6	0.2	0.0	0.0	0.0	0.0	3.0	1.1	11.1	1.2
2/21/13	3.4**	**	**	**	**	**	**	**	**	**	**	**	**
2/24/13	13.9	1.1	0.2	0.3	0.2	5.2	1.5	0.0	0.0	2.8	0.8	4.0	1.4
2/27/13	20.3	1.3	0.2	0.9	0.2	0.0	0.0	0.0	0.0	0.0	0.0	16.7	1.1
3/2/13	23.6	1.8	0.2	1.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	23.9	1.3
3/5/13	*	*	*	*	*	*	*	*	*	*	*	*	*
3/8/13	12.4	0.9	0.1	0.7	0.1	0.0	0.0	0.0	0.0	0.0	0.0	10.9	0.7
3/11/13	14.4	1.4	0.2	1.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	12.5	1.0

3/14/13	2.6**	**	**	**	**	**	**	**	**	**	**	**	**
3/17/13	15.5	1.0	0.2	0.6	0.1	0.0	0.0	0.0	0.0	2.0	0.7	11.8	0.9
3/20/13	1.0**	**	**	**	**	**	**	**	**	**	**	**	**
3/23/13	4.6**	**	**	**	**	**	**	**	**	**	**	**	**
3/26/13	6.2	0.7	0.1	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.0	3.5	0.7
3/29/13	11.8	0.6	0.1	0.6	0.1	0.0	0.0	0.0	0.0	1.3	0.5	9.4	0.9
Average	**27.8**	**1.5**	**0.3**	**0.6**	**0.1**	**0.8**	**0.2**	**0.8**	**0.2**	**4.9**	**1.1**	**18.8**	**1.8**

Notes: *No, incomplete, or invalid CMB data set. **Mass was too small to conduct a CMB analysis. ***Couldn't get a good statistical fit during CMB modeling.

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – EPA Profiles. NCORE – Winter 2012/2013.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	Autos	Autos STD ERR	Diesel	Diesel STD ERR	Wood Smoke	Wood Smoke STD ERR
11/2/12	*	*	*	*	*	*	*	*	*	*	*
11/5/12	*	*	*	*	*	*	*	*	*	*	*
11/8/12	29.9	5.9	0.7	2.4	0.8	0.0	0.0	0.0	0.0	22.3	1.9
11/11/12	16.3	1.8	0.2	0.8	0.2	0.0	0.0	0.0	0.0	13.7	0.9
11/14/12	23.0	3.2	0.4	1.7	0.4	0.0	0.0	2.9	0.7	15.8	1.9
11/17/12	3.7**	**	**	**	**	**	**	**	**	**	**
11/20/12	27.2	5.1	0.6	2.2	0.6	0.0	0.0	5.0	1.1	15.4	2.0
11/23/12	29.2	4.7	0.5	1.6	0.6	0.0	0.0	0.0	0.0	23.2	5.8
11/26/12	*	*	*	*	*	*	*	*	*	*	*
11/29/12	57.4	11.2	1.3	1.0	1.4	0.0	0.0	0.0	0.0	45.4	3.2
12/2/12	35.5	6.4	0.7	2.6	0.8	0.0	0.0	8.6	1.8	15.5	2.2
12/5/12	32.2	6.5	0.7	2.9	0.8	0.0	0.0	3.7	1.8	17.0	2.4
12/8/12	25.1	4.5	0.5	1.5	0.6	0.0	0.0	3.4	1.0	13.8	1.8
12/11/12	5.8**	**	**	**	**	**	**	**	**	**	**
12/14/12	11.4	1.9	0.2	0.9	0.4	0.0	0.0	2.9	0.6	7.2	1.0
12/17/12	49.2	10.9	1.2	3.1	1.4	0.0	0.0	5.8	2.1	34.6	4.3
12/20/12	46.4	12.2	1.4	2.9	1.5	12.4	7.4	0.0	0.0	21.1	3.6
12/23/12	41.2	9.8	1.1	2.8	1.2	13.4	6.0	0.0	0.0	16.9	3.0
12/26/12	27.8	5.9	0.7	1.9	0.7	0.0	0.0	4.9	1.6	14.8	2.1
12/29/12	28.2	4.4	0.5	2.3	0.6	0.0	0.0	5.1	1.3	14.8	2.0
1/1/13	7.9	1.0	0.1	0.7	0.1	0.0	0.0	0.0	0.0	6.7	0.6
1/4/13	23.4	3.4	0.4	1.6	0.4	0.0	0.0	5.1	1.1	13.0	1.8
1/7/13	*	*	*	*	*	*	*	*	*	*	*
1/10/13	21.6	3.3	0.4	2.5	0.4	0.0	0.0	3.6	0.8	12.8	1.6
1/13/13	14.9	2.2	0.3	1.1	0.3	0.0	0.0	2.0	0.7	10.0	1.4
1/16/13	26.7	4.9	0.5	2.9	0.6	0.0	0.0	4.9	1.4	13.9	1.9
1/19/13	22.4	4.6	0.5	2.0	0.6	0.0	0.0	0.0	0.0	16.1	2.0
1/22/13	27.9	4.8	0.5	2.1	0.7	0.0	0.0	3.5	1.0	17.7	2.3
1/25/13	28.6	6.3	0.7	2.4	0.8	8.0	3.9	0.0	0.0	13.3	2.1
1/28/13	40.3	8.7	1.0	2.2	1.1	0.0	0.0	0.0	0.0	27.0	2.8
1/31/13	***	***	***	***	***	***	***	***	***	***	***
2/3/13	22.5	3.7	0.4	1.3	0.5	0.0	0.0	0.0	0.0	14.8	1.4
2/6/13	19.6	3.6	0.4	2.5	0.5	0.0	0.0	4.2	1.3	8.2	1.4
2/9/13	21.4	3.3	0.4	1.7	0.4	0.0	0.0	4.6	1.0	9.6	1.4
2/12/13	25.5	5.1	0.6	2.8	0.7	0.0	0.0	5.2	1.5	12.7	1.8
2/15/13	3.8**	**	**	**	**	**	**	**	**	**	**
2/18/13	18.4	4.1	0.5	1.9	0.5	0.0	0.0	0.0	0.0	12.2	3.1
2/21/13	*	*	*	*	*	*	*	*	*	*	*
2/24/13	15.5	2.5	0.3	1.4	0.3	0.0	0.0	0.0	0.0	12.3	1.5
2/27/13	21.4	3.4	0.4	1.9	0.4	0.0	0.0	3.6	0.9	12.9	1.7
3/2/13	24.4	2.8	0.3	2.5	0.4	9.1	2.1	0.0	0.0	9.6	1.4
3/5/13	35.4	4.9	0.6	5.2	0.7	0.0	0.0	5.7	1.6	17.8	2.5
3/8/13	17.4	2.1	0.2	1.7	0.3	0.0	0.0	4.4	0.8	7.9	1.1
3/11/13	17.5	3.1	0.3	1.9	0.4	0.0	0.0	3.3	0.9	8.8	1.3

3/14/13	3.5**	**	**	**	**	**	**	**	**	**	**
3/17/13	13.0	2.2	0.2	1.4	0.3	0.0	0.0	0.0	0.0	9.0	1.2
3/20/13	11.4	2.0	0.2	1.3	0.3	0.0	0.0	0.0	0.0	8.1	1.1
3/23/13	5.0**	**	**	**	**	**	**	**	**	**	**
3/26/13	5.0**	**	**	**	**	**	**	**	**	**	**
3/29/13	10.8	1.8	0.2	1.4	0.2	0.0	0.0	0.0	0.0	8.0	1.1
Average	**25.5**	**4.7**	**0.5**	**2.0**	**0.6**	**1.1**	**0.5**	**2.4**	**0.7**	**15.1**	**2.0**

Notes: *No, incomplete, or invalid CMB data set. **Mass was too small to conduct a CMB analysis. ***Couldn't get a good statistical fit during CMB modeling**.**

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – OMNI Profiles. NCORE – Winter 2012/2013.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	Autos	Autos STD ERR	Diesel	Diesel STD ERR	No. 2 Fuel Oil	No. 2 Fuel Oil STD ERR	Wood Smoke	Wood Smoke STD ERR
11/2/12	*	*	*	*	*	*	*	*	*	*	*	*	*
11/5/12	*	*	*	*	*	*	*	*	*	*	*	*	*
11/8/12	29.9	3.2	0.6	2.1	0.5	5.6	2.8	0.0	0.0	14.8	2.6	4.5	0.9
11/11/12	16.3	1.0	0.2	0.6	0.1	0.0	0.0	0.0	0.0	3.4	0.8	10.9	1.2
11/14/12	23.0	2.2	0.4	1.2	0.3	0.0	0.0	0.0	0.0	6.6	1.7	13.1	1.5
11/17/12	3.7**	**	**	**	**	**	**	**	**	**	**	**	**
11/20/12	27.2	3.1	0.7	1.2	0.5	0.0	0.0	2.4	0.8	12.9	2.9	7.5	2.3
11/23/12	29.2	2.3	0.5	0.0	0.0	2.2	0.7	0.0	0.0	12.3	2.2	12.4	2.8
11/26/12	*	*	*	*	*	*	*	*	*	*	*	*	*
11/29/12	57.4	10.6	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	49.8	3.5
12/2/12	35.5	3.6	0.8	1.6	0.7	0.0	0.0	3.7	1.0	13.7	3.7	13.7	4.3
12/5/12	32.2	3.5	0.7	1.7	0.5	0.0	0.0	0.0	0.0	16.2	2.6	8.5	2.2
12/8/12	25.1	2.8	0.5	0.8	0.4	0.0	0.0	0.0	0.0	10.2	2.1	9.6	1.8
12/11/12	5.8**	**	**	**	**	**	**	**	**	**	**	**	**
12/14/12	11.4	1.4	0.3	0.6	0.2	0.0	0.0	3.5	0.7	3.1	1.0	2.1	0.4
12/17/12	49.2	6.2	1.1	0.0	0.0	0.0	0.0	0.0	0.0	28.7	4.3	18.7	3.6
12/20/12	46.4	6.9	1.2	0.0	0.0	0.0	0.0	0.0	0.0	28.6	4.6	10.3	5.7
12/23/12	41.2	5.3	1.0	1.1	0.7	0.0	0.0	0.0	0.0	24.7	3.9	8.2	4.8
12/26/12	27.8	3.5	0.6	1.0	0.5	0.0	0.0	0.0	0.0	12.6	2.6	10.0	2.1
12/29/12	28.2	2.6	0.5	1.7	0.4	0.0	0.0	0.0	0.0	8.6	1.9	13.2	1.7
1/1/13	7.9	0.9	0.1	0.7	0.1	0.0	0.0	0.0	0.0	0.0	0.0	8.0	0.6
1/4/13	23.4	2.1	0.4	1.0	0.3	4.6	2.0	0.0	0.0	7.3	1.6	7.9	2.1
1/7/13	*	*	*	*	*	*	*	*	*	*	*	*	*
1/10/13	21.6	2.2	0.5	1.9	0.4	0.0	0.0	1.5	0.6	7.7	2.0	8.4	1.7
1/13/13	14.9	2.2	0.2	1.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	11.6	0.9
1/16/13	26.7	2.8	0.5	2.2	0.4	0.0	0.0	0.0	0.0	10.5	2.1	10.6	1.8
1/19/13	22.4	2.7	0.5	1.2	0.4	0.0	0.0	0.0	0.0	10.5	2.0	9.1	1.8
1/22/13	27.9	2.8	0.5	1.2	0.4	0.0	0.0	0.0	0.0	11.5	2.1	13.3	1.8
1/25/13	28.6	3.5	0.6	1.4	0.5	0.0	0.0	0.0	0.0	14.9	2.6	9.9	3.2
1/28/13	40.3	8.4	0.9	2.1	1.1	0.0	0.0	0.0	0.0	0.0	0.0	21.7	2.2
1/31/13	***	1.4	0.2	1.6	0.2	0.0	0.0	0.0	0.0	0.0	0.0	9.2	0.5
2/3/13	22.5	3.5	0.4	1.3	0.4	0.0	0.0	0.0	0.0	0.0	0.0	12.1	1.1
2/6/13	19.6	2.2	0.4	2.0	0.4	0.0	0.0	1.8	0.7	7.2	2.1	7.1	2.6
2/9/13	21.4	2.3	0.4	1.2	0.3	6.3	1.8	0.0	0.0	5.2	1.6	7.1	2.8
2/12/13	25.5	3.3	0.6	2.1	0.5	0.0	0.0	0.0	0.0	9.3	2.4	10.5	2.0
2/15/13	3.8**	**	**	**	**	**	**	**	**	**	**	**	**
2/18/13	18.4	2.4	0.4	1.3	0.3	0.0	0.0	0.0	0.0	8.9	1.8	6.4	2.2
2/21/13	*	*	*	*	*	*	*	*	*	*	*	*	*
2/24/13	15.5	1.5	0.3	1.0	0.2	0.0	0.0	0.0	0.0	5.8	1.2	8.6	1.2
2/27/13	21.4	2.4	0.4	1.4	0.3	0.0	0.0	0.0	0.0	6.8	1.8	10.3	1.6
3/2/13	24.4	1.9	0.4	2.2	0.4	0.0	0.0	1.5	0.6	3.7	1.8	15.1	2.3
3/5/13	35.4	2.6	0.5	4.3	0.5	0.0	0.0	0.0	0.0	12.0	2.2	14.1	2.0
3/8/13	17.4	2.1	0.2	1.6	0.3	6.8	2.1	0.0	0.0	0.0	0.0	8.3	1.0
3/11/13	17.5	2.2	0.4	1.6	0.3	0.0	0.0	0.0	0.0	4.1	1.6	8.8	1.3

3/14/13	3.5**	**	**	**	**	**	**	**	**	**	**	**	**
3/17/13	13.0	1.5	0.3	1.1	0.2	0.0	0.0	0.0	0.0	3.5	1.1	7.2	1.1
3/20/13	11.4	1.4	0.3	1.0	0.2	0.0	0.0	0.0	0.0	3.1	1.1	6.1	1.0
3/23/13	5.0**	**	**	**	**	**	**	**	**	**	**	**	**
3/26/13	5.0**	**	**	**	**	**	**	**	**	**	**	**	**
3/29/13	10.8	1.2	0.2	1.1	0.2	0.0	0.0	0.0	0.0	3.1	0.9	6.1	1.0
Average	**25.1**	**3.0**	**0.5**	**1.3**	**0.3**	**0.7**	**0.2**	**0.4**	**0.1**	**8.5**	**1.8**	**11.0**	**2.0**

Notes: *No, incomplete, or invalid CMB data set. **Mass was too small to conduct a CMB analysis. ***Couldn't get a good statistical fit during CMB modeling.

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – EPA Profiles. NPF3 – Winter 2012/2013.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	Autos	Autos STD ERR	Diesel	Diesel STD ERR	Wood Smoke	Wood Smoke STD ERR
11/2/12	*	*	*	*	*	*	*	*	*	*	*
11/5/12	34.9	2.5	0.3	1.1	0.3	0.0	0.0	5.5	1.0	23.1	2.8
11/8/12	106.4	7.5	0.8	1.9	0.9	0.0	0.0	17.3	2.6	69.1	8.3
11/11/12	31.5	2.3	0.3	0.8	0.3	0.0	0.0	4.8	0.9	21.1	2.6
11/14/12	25.5	1.9	0.2	1.0	0.2	0.0	0.0	2.0	0.7	19.5	2.4
11/17/12	7.3	0.8	0.1	0.2	0.1	0.0	0.0	0.0	0.0	6.1	0.5
11/20/12	44.0	3.3	0.4	0.9	0.4	0.0	0.0	3.6	1.5	38.9	2.9
11/23/12	8.5	0.8	0.1	0.3	0.1	0.0	0.0	0.7	0.3	7.0	0.9
11/26/12	138.1	9.3	1.0	2.4	1.2	0.0	0.0	22.0	3.3	98.1	11.7
11/29/12	154.6	11.2	1.3	3.0	1.4	0.0	0.0	25.2	3.8	108.4	13.0
12/2/12	124.7	7.2	0.8	2.1	0.9	0.0	0.0	14.2	2.0	91.8	10.6
12/5/12	*	*	*	*	*	*	*	*	*	*	*
12/8/12	*	*	*	*	*	*	*	*	*	*	*
12/11/12	6.4	0.6	0.1	0.0	0.0	0.0	0.0	0.0	0.0	6.0	0.6
12/14/12	9.8	0.8	0.1	0.0	0.0	0.0	0.0	0.0	0.0	8.4	0.7
12/17/12	83.6	6.0	0.7	1.6	0.8	0.0	0.0	7.0	1.5	62.6	7.2
12/20/12	111.4	8.7	1.0	2.0	1.1	0.0	0.0	13.6	2.2	98.5	11.4
12/23/12	98.2	8.0	0.9	2.3	1.0	0.0	0.0	12.2	2.0	76.0	8.8
12/26/12	106.5	6.5	0.8	2.4	0.8	0.0	0.0	9.1	1.7	85.3	9.8
12/29/12	55.9	3.4	0.4	0.6	0.4	0.0	0.0	6.9	1.0	42.5	4.9
1/1/13	24.4	1.4	0.2	0.9	0.2	0.0	0.0	0.0	0.0	22.3	2.6
1/4/13	84.3	6.6	0.7	2.1	0.8	0.0	0.0	12.2	2.2	55.2	6.7
1/7/13	95.6	6.6	0.7	2.0	0.8	0.0	0.0	8.6	2.4	73.8	8.8
1/10/13	23.9	2.0	0.2	1.0	0.3	0.0	0.0	0.0	0.0	21.2	2.4
1/13/13	23.6	1.2	0.1	0.7	0.2	0.0	0.0	2.8	0.7	18.6	2.3
1/16/13	36.8	2.9	0.4	1.4	0.4	0.0	0.0	0.0	0.0	33.3	6.5
1/19/13	10.3	1.1	0.1	0.7	0.2	0.0	0.0	0.7	0.3	8.3	1.1
1/22/13	4.2**	**	**	**	**	**	**	**	**	**	**
1/25/13	58.1	5.7	0.7	2.2	0.7	0.0	0.0	4.2	1.3	45.5	5.3
1/28/13	66.2	5.9	0.7	1.6	0.7	0.0	0.0	4.4	1.5	57.1	6.7
1/31/13	36.1	2.8	0.3	1.6	0.4	0.0	0.0	3.6	1.2	26.6	3.3
2/3/13	24.0	1.5	0.2	1.5	0.2	0.0	0.0	0.0	0.0	21.1	2.4
2/6/13	26.0	3.1	0.3	1.9	0.4	0.0	0.0	2.8	1.0	16.9	2.1
2/9/13	30.1	1.7	0.2	0.9	0.2	6.1	1.7	0.0	0.0	21.3	2.7
2/12/13	26.6	2.5	0.3	1.4	0.3	7.0	2.5	0.0	0.0	17.5	2.4
2/15/13	*	*	*	*	*	*	*	*	*	*	*
2/18/13	*	*	*	*	*	*	*	*	*	*	*
2/21/13	4.0**	**	**	**	**	**	**	**	**	**	**
2/24/13	24.6	2.1	0.2	1.0	0.3	4.7	1.8	0.0	0.0	17.4	2.2
2/27/13	37.6	3.0	0.3	1.5	0.4	4.7	2.3	0.0	0.0	28.2	3.5
3/2/13	32.2	1.8	0.2	1.3	0.2	0.0	0.0	0.0	0.0	28.3	2.1
3/5/13	32.2	1.8	0.2	1.3	0.2	0.0	0.0	2.9	1.0	25.1	3.1
3/8/13	25.7	1.4	0.2	1.3	0.2	0.0	0.0	1.1	0.5	22.7	2.6
3/11/13	31.4	2.5	0.3	1.5	0.3	4.5	2.0	0.0	0.0	23.0	2.9

3/14/13	3.2**	**	**	**	**	**	**	**	**	**	**
3/17/13	25.3	1.7	0.2	1.1	0.3	0.0	0.0	1.5	0.5	21.2	2.5
3/20/13	9.8	1.0	0.1	0.8	0.1	0.0	0.0	0.0	0.0	8.0	0.9
3/23/13	6.6	0.8	0.1	0.5	0.1	0.0	0.0	0.0	0.0	5.8	0.7
3/26/13	6.3	0.7	0.1	0.4	0.1	0.0	0.0	0.0	0.0	5.4	0.7
3/29/13	23.5	1.2	0.1	1.2	0.2	0.0	0.0	1.6	0.5	19.9	2.3
Average	**46.9**	**3.4**	**0.4**	**1.3**	**0.4**	**0.6**	**0.2**	**4.5**	**0.9**	**35.9**	**4.2**

Notes: *No, incomplete, or invalid CMB data set. **Mass was too small to conduct a CMB analysis. ***Couldn't get a good statistical fit during CMB modeling.

$PM_{2.5}$ Source Contribution Estimates and Standard Errors (µg/m^3) – OMNI Profiles. NPF3 – Winter 2012/2013.

Date	$PM_{2.5}$ Mass	Sulfate	Sulfate STD ERR	Ammonium Nitrate	Ammonium Nitrate STD ERR	Autos	Autos STD ERR	Diesel	Diesel STD ERR	No. 2 Fuel Oil	No. 2 Fuel Oil STD ERR	Wood Smoke	Wood Smoke STD ERR
11/2/12	*	*	*	*	*	*	*	*	*	*	*	*	*
11/5/12	34.9	1.7	0.3	0.7	0.2	0.0	0.0	0.0	0.0	3.6	1.3	24.5	1.6
11/8/12	106.4	2.5	0.6	0.0	0.0	0.0	0.0	8.0	1.3	18.7	1.8	80.0	5.7
11/11/12	31.5	1.7	0.3	0.5	0.2	0.0	0.0	0.0	0.0	3.2	1.2	22.2	1.5
11/14/12	25.5	1.5	0.3	0.7	0.2	0.0	0.0	0.0	0.0	2.3	1.1	18.1	1.3
11/17/12	7.3	0.5	0.1	0.2	0.1	0.0	0.0	0.0	0.0	1.1	0.4	5.3	0.7
11/20/12	44.0	1.3	0.3	0.5	0.2	0.0	0.0	5.6	0.8	6.8	1.0	30.7	2.4
11/23/12	8.5	0.6	0.1	0.2	0.1	0.0	0.0	0.0	0.0	1.0	0.4	6.9	0.6
11/26/12	138.1	5.3	1.0	0.0	0.0	0.0	0.0	0.0	0.0	20.2	3.7	100.1	5.5
11/29/12	154.6	5.9	1.1	0.0	0.0	0.0	0.0	0.0	0.0	27.6	4.1	108.2	6.1
12/2/12	124.7	4.7	0.9	0.0	0.0	0.0	0.0	0.0	0.0	18.6	3.3	88.5	4.9
12/5/12	*	*	*	*	*	*	*	*	*	*	*	*	*
12/8/12	*	*	*	*	*	*	*	*	*	*	*	*	*
12/11/12	6.4	0.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.8	0.5
12/14/12	9.8	0.6	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.7	0.6
12/17/12	83.6	4.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	13.6	2.8	55.2	3.6
12/20/12	111.4	5.8	1.0	0.0	0.0	0.0	0.0	0.0	0.0	20.8	4.0	91.5	5.4
12/23/12	98.2	5.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	20.8	3.5	70.0	4.5
12/26/12	106.5	4.2	0.8	0.0	0.0	0.0	0.0	0.0	0.0	16.3	2.9	75.2	4.4
12/29/12	55.9	3.8	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	46.8	2.3
1/1/13	24.4	1.4	0.2	0.8	0.2	0.0	0.0	0.0	0.0	0.0	0.0	20.9	1.3
1/4/13	84.3	2.7	0.6	1.1	0.4	0.0	0.0	4.8	1.1	14.0	2.1	71.4	5.1
1/7/13	95.6	4.1	0.7	0.0	0.0	0.0	0.0	0.0	0.0	13.0	2.8	65.1	4.1
1/10/13	23.9	1.5	0.3	0.7	0.2	0.0	0.0	0.0	0.0	2.6	1.1	18.2	1.5
1/13/13	23.6	1.2	0.1	0.6	0.2	0.0	0.0	0.0	0.0	0.0	0.0	19.9	1.1
1/16/13	36.8	1.6	0.3	1.0	0.2	0.0	0.0	0.0	0.0	5.2	1.2	34.4	2.5
1/19/13	10.3	0.7	0.1	0.6	0.1	0.0	0.0	0.0	0.0	1.4	0.5	7.5	0.7
1/22/13	4.2**	**	**	**	**	**	**	**	**	**	**	**	**
1/25/13	58.1	3.7	0.7	1.1	0.5	0.0	0.0	0.0	0.0	12.5	2.8	37.4	3.0
1/28/13	66.2	3.8	0.7	0.0	0.0	0.0	0.0	0.0	0.0	12.9	2.6	47.4	3.5
1/31/13	36.1	1.8	0.3	1.1	0.3	0.0	0.0	0.0	0.0	4.9	1.4	24.8	1.9
2/3/13	24.0	1.4	0.2	1.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	19.6	1.3
2/6/13	26.0	2.1	0.4	1.4	0.3	0.0	0.0	0.0	0.0	5.6	1.6	14.6	1.5
2/9/13	30.1	0.9	0.2	0.6	0.1	4.1	1.1	0.0	0.0	2.6	0.7	22.4	2.2
2/12/13	26.6	1.8	0.3	1.1	0.3	0.0	0.0	0.0	0.0	3.7	1.3	17.4	1.5
2/15/13	*	*	*	*	*	*	*	*	*	*	*	*	*
2/18/13	*	*	*	*	*	*	*	*	*	*	*	*	*
2/21/13	4.0**	**	**	**	**	**	**	**	**	**	**	**	**
2/24/13	24.6	1.6	0.3	0.7	0.2	0.0	0.0	0.0	0.0	2.8	1.1	16.5	1.3
2/27/13	37.6	2.2	0.4	1.1	0.3	0.0	0.0	0.0	0.0	4.0	1.6	24.6	1.8
3/2/13	32.2	1.3	0.2	1.1	0.2	0.0	0.0	0.0	0.0	2.1	0.9	26.6	1.9
3/5/13	32.2	1.8	0.2	1.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	25.9	1.5
3/8/13	25.7	1.4	0.2	1.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	21.1	1.2
3/11/13	31.4	2.4	0.3	1.4	0.3	0.0	0.0	0.0	0.0	0.0	0.0	23.4	1.3

3/14/13	3.2**	**	**	**	**	**	**	**	**	**	**	**	**
3/17/13	25.3	1.2	0.2	0.8	0.2	0.0	0.0	0.0	0.0	2.8	0.9	19.5	1.3
3/20/13	9.8	0.6	0.1	0.7	0.1	0.0	0.0	0.0	0.0	1.0	0.5	8.4	0.8
3/23/13	6.6	0.5	0.1	0.4	0.1	0.0	0.0	0.0	0.0	0.8	0.4	5.9	0.7
3/26/13	6.3	0.4	0.1	0.3	0.1	0.0	0.0	0.0	0.0	0.8	0.3	5.2	0.6
3/29/13	23.5	1.2	0.1	1.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	19.7	1.1
Average	**46.9**	**2.2**	**0.4**	**0.6**	**0.1**	**0.1**	**0.03**	**0.4**	**0.1**	**6.4**	**1.3**	**34.7**	**2.3**

Notes: *No, incomplete, or invalid CMB data set. **Mass was too small to conduct a CMB analysis. ***Couldn't get a good statistical fit during CMB modeling.