

# HIDEMANN

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*Supplementary Material*

13 pages containing 9 tables

**Chemical Composition of Emissions from  
Urban Sources of Fine Organic Aerosol**Lynn M. Hildemann<sup>1</sup>, Gregory R. Markowski and Glen R. Cass\*Environmental Engineering Science Department and Environmental Quality Laboratory  
California Institute of Technology, Pasadena, California 91125**Bulk Chemical Analysis Results for Individual Source Tests**

The following tables contain the results of the bulk chemical analyses for each of the experiments performed for each source type. The values (except for the fine mass emission rates) are expressed as percent of the total fine particulate mass collected. The measurements have been corrected for the contribution of any trace species present in the dilution air, and as a result, negative values occasionally occur.

The standard deviation values listed with the individual measurements reflect the accuracy of the analytical methods. On the right side of each table, the mean of the multiple experimental values is calculated, along with the standard deviation of the mean of the sample population (designated as "S.D. of MEAN"). An asterisk (\*) is used to mark those species with mean values that are greater than zero by at least twice the standard deviation of the mean of the sample population. A plus sign (+) is used to mark those species where the concentrations measured in at least half of the experiments are greater than zero by at least twice the standard deviation of the analytical method.

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TABLE 1. BOILER BURNING NO.2 FUEL OIL

	46x Dilution		49x Dilution		27x Dilution		94x Dilution		35x Dilution		MEAN	S.D. of MEAN
	TEST 1 (% +- SD)		TEST 2 (% +- SD)		TEST 3 (% +- SD)		TEST 4 (% +- SD)		TEST 5 (% +- SD)			
AL	0.5696	0.0589	0.4990	0.0344	0.2485	0.0165	0.4211	0.0354	0.3644	0.0230	0.4205 **	0.0618
SI	0.4851	0.0443	0.4624	0.0304	0.2983	0.0176	2.8165	0.1481	0.3759	0.0224	0.8876 +	0.5404
P	0.2192	0.0474	0.2125	0.0441	0.1145	0.0231	0.1685	0.0344	0.1527	0.0309	0.1735 **	0.0217
S	12.0832	0.6444	11.6913	0.7121	4.8370	0.2480	8.9802	0.4734	7.9201	0.4296	9.1024 **	1.4831
CL	-0.0050	0.0383	0.0000	0.0224	-0.0020	0.0106	-0.0041	0.0246	0.0000	0.0151	-0.0022	0.0012
K	0.0000	0.0143	0.0000	0.0039	0.0000	0.0028	0.0097	0.0080	0.0021	0.0025	0.0024	0.0021
CA	0.0150	0.0093	-0.0034	0.0025	0.0062	0.0019	0.0086	0.0055	0.0021	0.0015	0.0057	0.0035
TI	0.0000	0.0080	0.0001	0.0017	0.0010	0.0012	0.0030	0.0033	0.0019	0.0009	0.0012	0.0006
V	0.0011	0.0051	0.0005	0.0013	-0.0008	0.0010	0.0024	0.0028	0.0000	0.0008	0.0006	0.0006
CR	0.0073	0.0054	0.0013	0.0014	0.0007	0.0010	0.0002	0.0031	0.0003	0.0008	0.0020	0.0015
HM	0.0000	0.0070	0.0000	0.0019	0.0000	0.0013	0.0000	0.0041	0.0000	0.0013	0.0000	0.0000
FE	0.2131	0.0186	0.1166	0.0084	0.0836	0.0054	0.1210	0.0100	0.0938	0.0059	0.1256 **	0.0257
NI	-0.0008	0.0047	0.0006	0.0012	-0.0006	0.0008	0.0023	0.0027	0.0006	0.0008	0.0004	0.0006
CU	-0.0111	0.0058	0.0035	0.0022	0.0032	0.0011	0.0055	0.0029	0.0048	0.0009	0.0012	0.0035
ZN	-0.0038	0.0045	0.0027	0.0017	0.0007	0.0008	0.0016	0.0021	0.0015	0.0007	0.0005	0.0013
GA	0.0008	0.0036	-0.0007	0.0010	0.0003	0.0007	-0.0005	0.0021	0.0002	0.0007	0.0000	0.0003
AS	0.0000	0.0157	0.0043	0.0043	0.0000	0.0032	0.0048	0.0084	0.0006	0.0028	0.0019	0.0012
SE	0.0046	0.0053	0.0009	0.0014	0.0018	0.0010	-0.0004	0.0032	0.0018	0.0009	0.0017	0.0009
BR	0.0150	0.0072	-0.0001	0.0019	0.0010	0.0013	0.0078	0.0042	0.0008	0.0013	0.0049	0.0032
RB	0.0005	0.0090	0.0027	0.0024	0.0000	0.0017	0.0023	0.0053	0.0001	0.0015	0.0011	0.0006
SR	0.0062	0.0110	-0.0025	0.0030	-0.0021	0.0021	0.0000	0.0064	0.0000	0.0020	0.0003	0.0017
Y	0.0225	0.0134	0.0009	0.0036	-0.0014	0.0025	-0.0048	0.0077	0.0017	0.0025	0.0038	0.0054
ZR	0.0034	0.0558	-0.0077	0.0150	-0.0085	0.0105	-0.0093	0.0322	-0.0037	0.0103	-0.0052	0.0026
MO	0.0000	0.0381	-0.0028	0.0102	-0.0028	0.0072	0.0200	0.0222	-0.0058	0.0069	0.0017	0.0052
PD	0.0059	0.0338	-0.0080	0.0093	0.0022	0.0064	0.0000	0.0198	0.0000	0.0063	0.0000	0.0025
AG	0.0193	0.0474	-0.0060	0.0127	0.0000	0.0089	-0.0015	0.0274	-0.0046	0.0089	0.0014	0.0051
CD	0.0117	0.0616	-0.0035	0.0166	0.0000	0.0114	-0.0215	0.0345	-0.0087	0.0112	-0.0044	0.0061
IN	-0.0017	0.0771	-0.0080	0.0209	-0.0051	0.0146	-0.0172	0.0443	0.0063	0.0142	-0.0051	0.0043
SN	-0.0153	0.0903	-0.0053	0.0243	0.0115	0.0172	0.0139	0.0539	-0.0019	0.0172	0.0006	0.0061
SB	0.0000	0.2037	0.0136	0.0539	0.0211	0.0376	0.0504	0.1203	0.0000	0.0380	0.0170	0.0104
BA	-0.2059	0.3776	-0.0754	0.1017	0.0000	0.0705	0.0000	0.2211	0.0000	0.0710	-0.0563	0.0449
LA	0.0000	0.6918	0.0000	0.1868	0.0000	0.1292	0.2380	0.4001	-0.0921	0.1283	0.0292	0.0617
HG	0.0019	0.0063	-0.0020	0.0017	-0.0012	0.0012	0.0007	0.0037	0.0003	0.0012	-0.0001	0.0008
PB	0.0826	0.0252	0.0217	0.0068	0.0247	0.0049	0.0146	0.0143	0.0158	0.0046	0.0319 **	0.0143
EC	25.9068	1.8270	22.6834	1.6198	41.3653	2.2830	39.5006	2.5779	15.1008	0.9820	28.9114 **	5.6224
OC	9.9046	1.1586	3.5424	0.5185	2.0351	0.3502	6.1411	0.9656	2.3908	0.3426	4.8028 **	1.6372
Backup filter OC	0.8426	0.7791	0.7795	0.3742	0.9787	0.3002	1.7988	0.7592	0.0361	0.2297	0.8871 **	0.3140
MG++	0.0471	0.0193	0.0171	0.0050	-0.0016	0.0037	0.0002	0.0098	0.0034	0.0032	0.0132	0.0102
NA+	0.1716	0.1330	0.0736	0.0344	0.2881	0.0254	0.6717	0.0675	0.0418	0.0219	0.2494 +	0.1274
CL-	0.1565	0.1633	0.0401	0.0422	0.0303	0.0312	0.0261	0.0822	0.0265	0.0269	0.0559	0.0283
NO3-	0.1159	0.1626	0.0297	0.0420	0.2189	0.0325	0.8333	0.0880	0.0196	0.0288	0.2435	0.1697
SO4=	35.4378	0.6152	36.2729	1.3171	22.6485	0.3425	26.2196	0.6146	36.9234	0.8578	31.5004 **	3.2971
NH4+	12.5708	0.3633	6.2779	0.3260	1.1671	0.0463	9.0837	0.4459	1.8776	0.0636	6.1954 **	2.4099
Fine Mass Emission Rate (ug/kJ burned)	4.5916	0.0492	9.0362	0.3023	12.7434	0.0259	9.2286	0.0926	11.2451	0.2107	9.3690	1.5383

Supplementary Material:

Chemical Composition of Emissions from Urban Sources of Fine Organic Aerosol  
L. M. Hildemann, G. R. Markowski and G. R. Cass

E-1159-M2

TABLE 2. AUTOMOBILE TESTS

	CATALYST CARS		CATALYST CARS		CATALYST CARS		MEAN	S.D. of MEAN
	TEST 1 (% +/- SD)		TEST 2 (% +/- SD)		TEST 3 (% +/- SD)			
AL	0.0000	0.7709	0.0000	0.1551	0.2090	0.3504	0.0697	0.0853
SI	-0.3748	0.5143	0.0000	0.0961	0.4961	0.3163	0.0404	0.3089
P	0.0000	0.3040	0.2708	0.2259	0.2420	0.1779	0.1709	0.1052
S	0.0000	2.8523	0.0000	0.5693	0.0000	1.2460	0.0000	0.0000
CL	0.1228	1.1947	0.0000	0.2399	-0.0092	0.5063	0.0379	0.0521
K	1.2149	0.6901	-0.0173	0.0959	0.0565	0.2191	0.4180	0.4887
CA	0.4758	0.4081	0.4107	0.0875	0.9906	0.4319	0.6257 **	0.2246
TI	-0.0151	0.1902	0.0044	0.0407	0.0554	0.0945	0.0149	0.0257
V	-0.0550	0.1462	0.0086	0.0299	-0.0185	0.0615	-0.0216	0.0226
CR	0.0136	0.1540	-0.0382	0.0326	-0.0647	0.0724	-0.0298	0.0282
MN	-0.0654	0.1916	-0.0148	0.0389	-0.0441	0.0869	-0.0414	0.0180
FE	0.4504	0.4523	-0.1690	0.0879	0.1602	0.2136	0.1472	0.2191
NI	-0.1190	0.1635	0.0051	0.0335	0.2381	0.1220	0.0414	0.1282
CU	0.0000	0.1992	0.8704	0.0786	2.4817	0.9855	1.1174 +	0.8904
ZN	0.3481	0.1944	0.8968	0.0734	1.9322	0.7662	1.0590 +	0.5688
GA	0.0000	0.1268	0.0000	0.0255	0.0000	0.0543	0.0000	0.0000
AS	0.0917	0.3997	-0.0456	0.0797	-0.1710	0.1865	-0.0416	0.0929
SE	-0.0424	0.1366	-0.0061	0.0281	-0.0153	0.0614	-0.0213	0.0133
BR	0.0819	0.1923	-0.0271	0.0389	0.0665	0.0890	0.0404	0.0417
RB	-0.2634	0.2570	-0.0045	0.0480	-0.1063	0.1099	-0.1247	0.0922
SR	-0.2677	0.3136	0.0099	0.0598	0.0227	0.1263	-0.0784	0.1160
Y	0.0000	0.3622	0.0000	0.0724	0.0746	0.1595	0.0249	0.0305
ZR	0.0000	1.5443	0.0000	0.3096	0.0000	0.6698	0.0000	0.0000
MD	1.0169	1.0764	-0.1677	0.2040	0.0647	0.4298	0.3046	0.4438
PD	-0.0238	0.9948	-0.0247	0.2009	0.2339	0.4460	0.0618	0.1054
AG	0.0000	1.4137	0.0000	0.2815	0.0000	0.6026	0.0000	0.0000
CD	0.0000	1.7502	0.0000	0.3503	0.4329	0.7881	0.1443	0.1767
IN	0.0000	2.1367	0.0000	0.4255	0.3782	0.9347	0.1261	0.1544
SM	0.0000	2.5868	-0.1850	0.5222	0.0000	1.1094	-0.0617	0.0755
SB	0.0000	5.7802	0.0000	1.1570	2.5102	2.7265	0.8367	1.0248
BA	0.0000	11.0548	0.0000	2.2210	0.3483	4.8005	0.1161	0.1422
LA	0.0000	19.2639	0.0000	3.8500	-0.5324	8.4870	-0.1775	0.2174
HG	0.0068	0.1670	-0.0101	0.0325	0.0402	0.0733	0.0123	0.0181
PB	0.0000	0.6791	0.0225	0.1368	0.5374	0.3633	0.1866	0.2149
EC	36.6434	22.5840	13.7613	4.0215	17.4135	15.6411	22.6061 *	8.6925
OC	37.5699	26.5490	88.6267	7.7449	44.0639	25.2486	50.0868 *	11.5831
Backup filter OC	-6.5652	21.2399	13.7930	4.8374	24.1186	20.2143	10.4488	11.0400
HG++	0.8674	0.5355	-0.2060	0.0929	-8.8511	3.4584	-2.7299	3.7676
NA+	2.2012	3.1107	0.4780	0.6364	1.8110	2.5144	1.4967 *	0.6389
CL-	3.6017	3.9138	0.7821	0.7821	2.9631	3.1812	2.4490 *	1.0454
NO3-	2.6680	3.8059	0.5794	0.7791	2.1950	3.0758	1.8141 *	0.7744
SO4=	8.4046	4.7741	0.4924	0.7778	1.8656	3.0385	3.5875	2.9895
NH4+	0.0000	2.3195	0.0000	0.4824	0.0000	1.8485	0.0000	0.0000
Fine Mass Emission Rate (mg/km driven)	9.939	3.530	31.063	1.346	12.353	4.802	17.785	8.176

E-159-M4

Supplementary Material:

Chemical Composition of Emissions from  
Urban Sources of Fine Organic Aerosol  
L. M. Hildemann, G. R. Markowski and G. R. Cass

TABLE 2. AUTOMOBILE TESTS (CONT.)

	NONCATALYST CARS		NONCATALYST CARS		NONCATALYST CARS		MEAN	S.D. of MEAN
	TEST 1 (% +/- SD)	TEST 2 (% +/- SD)	TEST 2 (% +/- SD)	TEST 3 (% +/- SD)	TEST 3 (% +/- SD)	TEST 3 (% +/- SD)		
AL	0.6441	0.2277	1.1060	0.3198	0.4496	0.1300	0.7332	** 0.2384
SI	0.3993	0.0775	0.5890	0.1587	0.1893	0.0506	0.3925	** 0.1414
P	0.6764	0.4213	0.3598	0.2820	0.4077	0.2648	0.4813	* 0.1207
S	0.0000	0.9482	0.0000	1.0846	0.0000	0.5862	0.0000	0.0000
CL	-0.0526	0.2118	0.0686	0.3047	0.0000	0.1240	0.0053	0.0430
K	-0.0032	0.0500	0.2326	0.1004	0.0506	0.0275	0.0933	0.0874
CA	0.5960	0.0805	0.4938	0.1229	-0.2479	0.0421	0.4459	** 0.1265
TI	0.0220	0.0206	0.0967	0.0379	0.0141	0.0100	0.0443	0.0322
V	-0.0084	0.0148	-0.0024	0.0248	-0.0050	0.0071	-0.0053	0.0021
CR	0.0000	0.0148	0.0157	0.0267	0.0182	0.0083	0.0113	0.0070
MN	0.9437	0.1023	1.3881	0.0932	0.3787	0.0479	0.9035	** 0.3577
FE	0.4740	0.0711	0.3617	0.1025	1.4095	0.1762	0.7484	+ 0.4068
NI	0.0093	0.0155	-0.1565	0.0407	0.0601	0.0125	-0.0290	0.0801
CU	0.1895	0.0318	0.9480	0.0764	0.3788	0.0853	0.6054	** 0.2719
ZN	0.6607	0.0736	0.6328	0.0570	0.5162	0.0643	0.6032	** 0.0542
GA	0.0083	0.0263	0.0881	0.0488	0.0082	0.0236	0.0349	0.0326
AS	0.1985	0.5741	-0.0531	0.5585	-0.0239	0.3446	0.0405	0.0973
SE	-0.0010	0.0149	0.0057	0.0267	0.0000	0.0076	0.0016	0.0026
BR	3.6693	0.3799	4.5140	0.2394	1.9614	0.2358	3.3816	** 0.9195
RB	0.0271	0.0533	0.0000	0.0724	-0.0019	0.0278	0.0084	0.0115
SR	-0.0076	0.0296	0.0492	0.0515	0.0000	0.0136	0.0139	0.0218
Y	0.0000	0.0492	0.0026	0.0723	0.0294	0.0274	0.0107	0.0115
ZR	0.0000	0.1522	-0.1098	0.2697	-0.0317	0.0710	-0.0472	0.0400
MO	0.0048	0.0986	0.0480	0.1722	-0.0115	0.0451	0.0138	0.0217
PD	-0.0172	0.0970	0.0746	0.1777	-0.0251	0.0471	0.0108	0.0392
AG	0.0000	0.1367	0.0000	0.2398	0.1041	0.0690	0.0347	0.0425
CD	0.0155	0.1712	0.0000	0.2984	0.0000	0.0790	0.0052	0.0063
IN	0.0083	0.2084	0.2813	0.3837	0.1184	0.0996	0.1360	0.0971
SN	0.0000	0.2521	-0.3380	0.4519	-0.0685	0.1177	-0.1355	0.1263
SB	-0.3083	0.5776	-0.4322	0.9955	0.0076	0.2604	-0.2443	0.1604
BA	0.0000	1.0788	-1.4295	1.9333	0.0000	0.5001	-0.4765	0.5836
LA	0.7085	1.9185	-3.9106	3.4312	0.5563	0.8960	-0.8819	1.8555
HG	-0.0029	0.0171	-0.0062	0.0323	-0.0065	0.0095	-0.0052	0.0014
PB	9.5995	0.9949	10.0484	0.5493	6.3320	0.7603	8.6600	** 1.4344
EC	9.3717	3.3488	4.0625	7.1697	10.6070	2.5382	8.0137	** 2.4587
OC	57.6146	7.9671	75.2600	11.3137	63.4949	8.5423	65.4565	** 6.3532
Backup filter OC	15.3935	4.3398	40.9456	9.8162	11.2201	2.9576	22.5197	+ 11.3796
MG++	-1.9287	0.1876	0.5056	0.1845	0.1084	0.0495	-0.4382	+ 0.9235
MA+	0.3771	0.5024	0.9428	1.2684	0.2461	0.3319	0.5220	0.2618
CL-	0.6170	0.6182	1.5427	1.5582	0.4026	0.4088	0.8541	0.4284
NO3-	0.4571	0.6150	1.1428	1.5528	0.2982	0.4063	0.6327	0.3174
SO4=	0.5714	0.6140	0.5142	1.5471	0.2535	0.4054	0.4464	* 0.1198
NH4+	0.0000	0.3880	0.0000	0.9879	0.0000	0.2549	0.0000	0.0000
Fine Mass Emission Rate (mg/km driven)	60.644	5.436	23.530	4.436	94.008	10.183	59.394	24.930

TABLE 3. HEAVY-DUTY TRUCK TESTS

	H-D DIESEL TRUCK		H-D DIESEL TRUCK		MEAN	S.D. of MEAN
	TEST 1 (% +/- SD)		TEST 2 (% +/- SD)			
AL	0.0654	0.0839	0.0391	0.0353	0.0522 *	0.0186
SI	0.6639	0.0934	0.5153	0.0846	0.5896 **	0.1051
P	0.0115	0.0327	0.0450	0.0304	0.0283	0.0237
S	0.0000	0.3026	0.0000	0.1273	0.0000	0.0000
CL	0.0000	0.1271	-0.0099	0.0524	-0.0049	0.0070
K	0.0714	0.0549	0.0397	0.0228	0.0556 *	0.0224
CA	0.2272	0.0446	0.0831	0.0209	0.1551 +	0.1019
TI	0.0244	0.0217	0.0352	0.0101	0.0298 **	0.0076
V	0.0162	0.0152	-0.0017	0.0052	0.0073	0.0127
CR	0.0272	0.0171	0.0089	0.0072	0.0181	0.0129
MN	0.0151	0.0207	0.0028	0.0086	0.0090	0.0087
FE	0.2090	0.0480	0.0499	0.0200	0.1295 +	0.1125
NI	0.0501	0.0213	0.0031	0.0071	0.0266 +	0.0332
CU	-0.5017	0.0596	0.0271	0.0104	-0.2373 +	0.3739
ZN	-0.2522	0.0382	0.1130	0.0155	-0.0696 +	0.2582
GA	0.0000	0.0138	0.0000	0.0056	0.0000	0.0000
AS	0.0405	0.0428	-0.0102	0.0176	0.0152	0.0359
SE	-0.0101	0.0147	0.0016	0.0082	-0.0042	0.0083
BR	0.0204	0.0207	0.0022	0.0084	0.0113	0.0129
RB	0.0018	0.0258	-0.0045	0.0107	-0.0013	0.0045
SR	-0.0110	0.0318	-0.0052	0.0131	-0.0081	0.0041
Y	0.0094	0.0392	0.0000	0.0161	0.0047	0.0066
ZR	0.0000	0.1853	0.0000	0.0686	0.0000	0.0000
MD	0.0223	0.1082	-0.0182	0.0444	0.0020	0.0286
PD	0.0000	0.1055	0.0000	0.0442	0.0000	0.0000
AG	0.0000	0.1515	0.0000	0.0629	0.0000	0.0000
CD	0.0000	0.1875	0.0000	0.0770	0.0000	0.0000
IN	0.0000	0.2280	0.0000	0.0943	0.0000	0.0000
SN	-0.1407	0.2787	0.0299	0.1155	-0.0554	0.1206
SB	0.0081	0.6181	0.0581	0.2577	0.0331	0.0354
BA	0.0000	1.1791	0.0000	0.4873	0.0000	0.0000
LA	0.0000	2.0685	0.0000	0.8598	0.0000	0.0000
HG	-0.0032	0.0180	0.0022	0.0073	-0.0005	0.0038
PB	0.0000	0.0723	0.0000	0.0301	0.0000	0.0000
EC	43.1302	3.8482	37.9459	4.6783	40.5381 **	3.8658
OC	34.6152	3.8558	30.5139	3.9241	32.5646 **	2.9000
Backup filter OC	14.1768	2.8584	9.9788	1.7024	12.0778 **	2.9684
HG++	-1.5264	0.0631	-0.0150	0.0203	-0.7707	1.0687
NA+	0.2464	0.3334	0.0996	0.1393	0.1730	0.1038
CL-	0.4031	0.4096	0.1629	0.1715	0.2830	0.1698
NO3-	0.2986	0.4081	0.3561	0.1757	0.3273 **	0.0407
SO4-	-0.0962	0.4110	0.5311	0.1816	0.2174 +	0.4436
NH4+	0.0000	0.2569	0.1590	0.1105	0.0795	0.1124
Fine Mass Emission Rate (mg/km driven)	360.14	9.52	456.17	47.65	408.16	67.90

TABLE 4. FIREPLACE TESTS

	PINE WOOD		PINE WOOD		MEAN	S.D. of MEAN
	TEST 1 (% +/- SD)		TEST 2 (% +/- SD)			
AL	0.0169	0.0034	0.0125	0.0035	0.0147 **	0.0031
SI	0.0286	0.0050	0.0392	0.0050	0.0339 **	0.0075
P	0.0204	0.0128	0.0224	0.0139	0.0214 *	0.0014
S	0.0920	0.0148	0.0701	0.0104	0.0811 **	0.0155
CL	0.5082	0.0715	0.5713	0.0313	0.5398 **	0.0446
K	0.4005	0.0562	0.5476	0.0288	0.4740 **	0.1040
CA	0.0169	0.0033	0.0166	0.0033	0.0168 **	0.0002
TI	0.0008	0.0004	0.0002	0.0006	0.0005	0.0004
V	-0.0002	0.0003	0.0000	0.0004	-0.0001	0.0001
CR	0.0007	0.0003	0.0011	0.0005	0.0009 **	0.0003
MN	0.0001	0.0003	-0.0002	0.0006	0.0000	0.0002
FE	0.0103	0.0018	0.0069	0.0014	0.0086 **	0.0024
NI	0.0014	0.0004	0.0040	0.0006	0.0027 +	0.0018
CU	0.0247	0.0035	0.0003	0.0007	0.0125 +	0.0173
ZN	0.0231	0.0033	0.0108	0.0009	0.0170 +	0.0087
GA	-0.0001	0.0003	-0.0001	0.0004	-0.0001	0.0000
AS	0.0011	0.0018	0.0016	0.0013	0.0014 *	0.0004
SE	0.0000	0.0003	0.0000	0.0004	0.0000	0.0000
BR	0.0017	0.0004	0.0013	0.0006	0.0015 **	0.0003
RB	0.0007	0.0005	0.0001	0.0007	0.0004	0.0004
SR	0.0000	0.0005	0.0002	0.0009	0.0001	0.0001
Y	0.0000	0.0007	0.0000	0.0011	0.0000	0.0000
ZR	0.0000	0.0028	0.0000	0.0045	0.0000	0.0000
MD	0.0000	0.0018	0.0000	0.0029	0.0000	0.0000
PD	0.0000	0.0018	-0.0002	0.0030	-0.0001	0.0001
AG	0.0000	0.0023	0.0070	0.0042	0.0035	0.0049
CD	-0.0012	0.0031	0.0000	0.0050	-0.0006	0.0008
IN	0.0000	0.0039	0.0000	0.0063	0.0000	0.0000
SN	-0.0036	0.0047	-0.0008	0.0076	-0.0022	0.0020
SB	-0.0030	0.0103	-0.0139	0.0172	-0.0084	0.0077
BA	-0.0104	0.0197	0.0000	0.0321	-0.0052	0.0074
LA	-0.0155	0.0349	0.0000	0.0575	-0.0077	0.0110
HG	0.0000	0.0003	0.0000	0.0006	0.0000	0.0000
PB	0.0287	0.0043	0.0091	0.0021	0.0189 +	0.0139
EC	7.2816	1.0294	3.1851	0.2343	5.2334 +	2.8967
OC	48.6419	6.8046	48.1992	2.5215	48.4206 **	0.3125
Backup filter OC	1.0914	0.1762	0.8202	0.1722	0.9558 **	0.1918
HG++	-0.0078	0.0016	0.0575	0.0022	0.0249 +	0.0482
NA+	0.1564	0.0220	0.0325	0.0150	0.0944 +	0.0876
CL-	1.0259	0.1350	0.7692	0.0246	0.8976 **	0.1815
NO3-	0.1172	0.0188	0.1517	0.0194	0.1345 **	0.0244
SO4-	0.1889	0.0272	0.1028	0.0190	0.1459 **	0.0609
NH4+	0.2096	0.0288	0.1700	0.0137	0.1898 **	0.0280
Fine Mass Emission Rate (g/kg wood)	15.809	2.060	10.140	0.045	12.975	4.009

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TABLE 4. FIREPLACE TESTS (CONT.)

	OAK WOOD		ALMOND WOOD		ALMOND WOOD		MEAN	S.D. of MEAN	
	TEST 3 (% +- SD)		TEST 4 (% +- SD)		TEST 5 (% +- SD)				
AL	0.0137	0.0048	0.0109	0.0058	0.0096	0.0045	0.0114	**	0.0016
SI	0.2393	0.0297	0.0991	0.0117	0.0402	0.0064	0.1262	+	0.0723
P	0.0231	0.0155	0.0312	0.0193	0.0213	0.0138	0.0252	*	0.0037
S	0.1294	0.0180	0.1242	0.0166	0.0521	0.0145	0.1019	**	0.0306
CL	0.4809	0.0378	0.7477	0.0413	0.3201	0.0200	0.5162	**	0.1527
K	0.7930	0.0596	1.2669	0.0655	0.5780	0.0310	0.8793	**	0.2492
CA	0.0035	0.0045	0.0092	0.0066	0.0186	0.0040	0.0104		0.0054
TI	0.0004	0.0008	0.0000	0.0008	0.0005	0.0009	0.0003		0.0002
V	-0.0003	0.0006	-0.0002	0.0006	0.0002	0.0007	-0.0001		0.0002
CR	0.0000	0.0007	-0.0004	0.0007	0.0053	0.0009	0.0016		0.0022
MN	0.0003	0.0008	0.0005	0.0008	0.0000	0.0009	0.0003		0.0002
FE	0.0048	0.0019	-0.0001	0.0019	0.0212	0.0027	0.0086	+	0.0079
NI	0.0021	0.0007	0.0000	0.0007	0.0033	0.0009	0.0018	+	0.0012
CU	0.0003	0.0009	0.0001	0.0010	-0.0007	0.0010	-0.0001		0.0004
ZN	0.0141	0.0014	0.0332	0.0021	0.0194	0.0015	0.0222	**	0.0070
GA	0.0000	0.0005	0.0000	0.0006	0.0000	0.0006	0.0000		0.0000
AS	0.0016	0.0022	0.0013	0.0018	-0.0005	0.0019	0.0008		0.0008
SE	0.0001	0.0005	-0.0003	0.0006	-0.0002	0.0006	-0.0001		0.0001
BR	0.0142	0.0014	0.0043	0.0009	0.0018	0.0009	0.0068	+	0.0046
RB	0.0005	0.0010	0.0013	0.0011	0.0007	0.0011	0.0008	*	0.0003
SR	0.0001	0.0012	0.0004	0.0013	0.0000	0.0013	0.0002		0.0001
Y	0.0007	0.0015	0.0000	0.0016	0.0000	0.0016	0.0002		0.0003
ZR	0.0000	0.0063	-0.0011	0.0069	-0.0037	0.0070	-0.0016		0.0013
HD	0.0000	0.0039	-0.0025	0.0044	-0.0046	0.0045	-0.0024		0.0016
PD	-0.0043	0.0042	-0.0011	0.0046	-0.0009	0.0044	-0.0021		0.0013
AG	0.0000	0.0057	0.0000	0.0060	-0.0025	0.0064	-0.0008		0.0010
CD	0.0000	0.0070	0.0001	0.0077	0.0000	0.0078	0.0000		0.0000
IN	0.0055	0.0087	0.0000	0.0093	0.0021	0.0096	0.0025		0.0020
SN	-0.0036	0.0105	-0.0097	0.0115	-0.0123	0.0118	-0.0085		0.0032
SB	0.0076	0.0231	0.0065	0.0256	0.0000	0.0253	0.0047		0.0029
BA	0.0000	0.0444	-0.0171	0.0497	0.0000	0.0497	-0.0057		0.0070
LA	-0.0298	0.0784	-0.0119	0.0875	-0.0765	0.0883	-0.0394		0.0236
HG	-0.0006	0.0007	0.0004	0.0008	0.0003	0.0008	0.0000		0.0004
PB	0.0231	0.0034	0.0046	0.0031	0.0057	0.0031	0.0111		0.0073
EC	2.9314	0.3070	3.4087	0.2971	2.2456	0.2277	2.8619	**	0.4134
OC	47.2881	3.5763	48.7538	2.5717	49.1487	2.5760	48.3969	**	0.6933
Backup filter OC	2.6866	0.3096	2.6835	0.2915	2.7667	0.2678	2.7123	**	0.0334
HG++	-0.0547	0.0047	-0.0173	0.0037	0.0273	0.0035	-0.0149		0.0290
NA+	0.0416	0.0252	0.0189	0.0253	0.0006	0.0243	0.0204		0.0145
CL-	0.6657	0.0505	0.8539	0.0374	0.4115	0.0327	0.6437	**	0.1570
NO3-	0.2300	0.0346	0.3205	0.0332	0.2099	0.0311	0.2535	**	0.0417
SO4=	0.3063	0.0367	0.2678	0.0327	0.1851	0.0309	0.2531	**	0.0438
NH4+	0.1536	0.0228	0.1371	0.0211	0.1450	0.0204	0.1452	**	0.0058
Fine Mass Emission Rate (g/kg wood)	6.157	0.330	4.654	0.009	5.018	0.021	6.276		0.554

TABLE 5. NATURAL GAS HOME APPLIANCE TESTS

	NATURAL GAS		NATURAL GAS		NATURAL GAS		MEAN	S.D. of MEAN
	TEST 1 (% +/- SD)		TEST 2 (% +/- SD)		TEST 3 (% +/- SD)			
AL	-0.1362	0.2917	0.4358	0.9209	0.3730	0.2458	0.2242	0.2218
SI	-0.4732	0.2680	0.8153	0.6947	0.4979	0.1961	0.2800	0.4747
P	-0.0789	0.1531	0.0422	0.4747	0.1272	0.1201	0.0302	0.0732
S	-0.0968	1.0187	0.0000	3.1294	2.2988	0.8689	0.7340	0.9589
CL	-0.1685	0.4589	-0.0494	1.4024	-0.0592	0.3455	-0.0924	0.0468
K	0.0661	0.2026	0.3195	0.6380	0.1347	0.1760	0.1734	0.0927
CA	1.7425	0.7129	0.7117	0.6026	0.6713	0.1675	1.0418 **	0.4293
TI	0.0581	0.0769	0.1772	0.2444	0.0559	0.0556	0.0971	0.0491
V	0.0402	0.0582	-0.0213	0.1770	0.0339	0.0409	0.0176	0.0239
CR	-0.0215	0.0581	0.1001	0.1817	0.0567	0.0471	0.0451	0.0436
MN	0.0171	0.0738	0.0703	0.2248	-0.0315	0.0524	0.0186	0.0360
FE	-0.4302	0.2326	-0.0182	0.5118	0.7107	0.1842	0.0874	0.4085
NI	-0.0215	0.0581	0.1474	0.2050	0.1418	0.0586	0.0892	0.0678
CU	-0.1263	0.1127	-2.3321	1.0584	1.8233	0.2821	-0.2117	1.4701
ZN	0.0091	0.0684	-1.6249	0.7356	1.1349	0.1804	-0.1603	0.9812
GA	-0.0215	0.0409	0.0000	0.1208	0.0000	0.0319	-0.0072	0.0088
AS	0.0000	0.1471	0.0000	0.4645	0.0000	0.1103	0.0000	0.0000
SE	0.0741	0.0630	0.1687	0.1904	-0.0596	0.0415	0.0611	0.0811
BR	-0.0534	0.0764	0.1985	0.2472	-0.0389	0.0525	0.0354	0.1000
RB	0.1051	0.1112	-0.0582	0.3358	0.0030	0.0784	0.0166	0.0583
SR	0.1868	0.1378	-0.5953	0.4397	-0.0376	0.0843	-0.1487	0.2848
Y	0.0119	0.1421	0.2066	0.4541	-0.0468	0.1047	0.0572	0.0938
ZR	0.0000	0.5889	-0.6052	1.8871	0.0000	0.4436	-0.2017	0.2471
HO	0.7512	0.5031	-0.2485	1.2779	0.0297	0.2932	0.1775	0.3648
PD	-0.1470	0.4405	1.1949	1.4602	0.0806	0.3133	0.3762	0.5078
AG	-0.2474	0.5379	0.9158	1.8189	-0.1080	0.3951	0.1868	0.4491
CD	0.0000	0.6154	-0.3728	1.9858	0.6447	0.4747	0.0906	0.3640
IN	-0.4553	0.8485	-1.3585	2.6808	-0.8188	0.6518	-0.8775	0.3213
SN	-0.5700	1.0344	0.0000	3.1337	-0.0316	0.7576	-0.2005	0.2265
SB	-0.6668	2.1392	2.1648	6.7398	0.2299	1.6541	0.5760	1.0233
BA	-2.3339	4.1696	0.7872	12.8740	0.8699	3.0437	-0.2256	1.2914
LA	-2.9685	7.4680	0.0000	23.2957	0.1503	5.6304	-0.9394	1.2437
HG	0.0000	0.1259	0.2671	0.4266	0.0000	0.0957	0.0890	0.1090
PB	0.1872	0.2657	-0.1807	0.8029	-0.0011	0.1914	0.0018	0.1301
EC	-0.6511	10.2302	13.4194	36.5968	7.3890	12.2098	6.7191	4.9916
OC	72.3370	32.2129	89.5293	60.0495	92.8916	20.9725	84.9193 **	7.7962
Backup filter OC	52.2755	25.5560	74.1429	57.7532	58.6367	22.8616	61.6850 **	7.9535
HG	0.0455	0.2585	-9.9328	4.2487	5.3669	0.7674	-1.5068	5.4922
NA	0.8242	1.8014	4.4239	6.3580	1.1522	1.9331	2.1334	1.4074
CL	2.0996	2.3253	7.2383	8.0628	2.2873	2.3869	3.8751	2.0606
NO3	5.1326	2.9589	1.8763	7.4351	3.2193	2.4049	3.4094 *	1.1571
SO4	2.9551	2.4624	29.2228	14.1046	5.7609	2.5047	12.6463 +	10.1994
NH4	1.3289	1.4802	0.0000	4.6135	0.0000	1.4842	0.4430	0.5425
Fine Mass Emission Rate (ng/kJ burned)	71.51	27.76	22.48	9.40	43.50	5.79	45.82	17.40



TABLE 6. MEAT COOKING TESTS

	XLEAN, CHARBR.		REGULAR, CHARBR.		MEAN	S.D. of MEAN	Avg. of S.D.s
	TEST 1 (% +- SD)		TEST 2 (% +- SD)				
AL	0.1000	0.0504	0.0592	0.0138	0.0796 **	0.0288	0.0321
SI	0.1565	0.0422	0.0591	0.0127	0.1078 +	0.0689	0.0274
P	0.0858	0.0371	0.1180	0.0276	0.1019 **	0.0228	0.0323
S	0.0980	0.1804	0.0179	0.0392	0.0579	0.0566	0.0998
CL	0.0937	0.0741	0.0816	0.0194	0.0877 **	0.0086	0.0468
K	0.0620	0.0338	0.2676	0.0225	0.1648 +	0.1454	0.0281
CA	0.0939	0.0307	0.0191	0.0087	0.0565 +	0.0529	0.0197
TI	0.0197	0.0122	0.0011	0.0029	0.0104	0.0132	0.0075
V	0.0042	0.0078	0.0014	0.0020	0.0028	0.0020	0.0049
CR	-0.0014	0.0090	-0.0006	0.0021	-0.0010	0.0006	0.0055
MN	-0.0009	0.0104	-0.0004	0.0023	-0.0007	0.0004	0.0063
FE	0.1118	0.0347	0.0309	0.0082	0.0714 +	0.0572	0.0214
NI	0.0070	0.0112	0.0076	0.0033	0.0073 **	0.0004	0.0072
CU	0.5925	0.0872	0.0947	0.0161	0.3436 +	0.3520	0.0517
ZN	0.3818	0.0563	0.0506	0.0100	0.2162 +	0.2342	0.0331
GA	-0.0054	0.0070	-0.0008	0.0015	-0.0031	0.0033	0.0043
AS	0.0000	0.0216	0.0040	0.0049	0.0020	0.0028	0.0133
SE	0.0042	0.0084	-0.0028	0.0018	0.0007	0.0049	0.0051
BR	0.0145	0.0113	0.0033	0.0023	0.0089	0.0079	0.0068
RB	0.0038	0.0152	-0.0060	0.0033	-0.0011	0.0069	0.0093
SR	0.0100	0.0167	-0.0015	0.0038	0.0042	0.0081	0.0103
Y	0.0046	0.0208	0.0014	0.0046	0.0030	0.0023	0.0127
ZR	0.0000	0.0902	0.0000	0.0200	0.0000	0.0000	0.0551
MO	0.0547	0.0586	0.0000	0.0125	0.0273	0.0387	0.0356
PD	-0.0184	0.0691	0.0000	0.0131	-0.0092	0.0130	0.0411
AG	0.0481	0.0794	0.0056	0.0178	0.0269	0.0301	0.0486
CD	-0.0046	0.0936	0.0143	0.0199	0.0049	0.0134	0.0567
IN	0.0599	0.1204	-0.0020	0.0284	0.0290	0.0438	0.0744
SN	0.0662	0.1515	0.0098	0.0329	0.0380	0.0399	0.0922
SB	0.0084	0.3112	-0.0296	0.0687	-0.0106	0.0269	0.1900
BA	0.3367	0.6091	0.0610	0.1356	0.1988	0.1949	0.3724
LA	-0.6961	1.1357	0.1955	0.2469	-0.2503	0.6305	0.6913
HG	-0.0009	0.0180	0.0001	0.0044	-0.0004	0.0007	0.0112
PB	0.0565	0.0382	-0.0034	0.0082	0.0265	0.0424	0.0232
EC	-0.8988	2.8686	0.1053	0.5968	-0.3968	0.7100	1.7327
OC	60.6118	9.6166	56.9780	4.3568	58.7949 **	2.5694	6.9867
Backup filter OC	8.1833	3.9121	2.6121	0.9488	5.3977 +	3.9394	2.4304
HG	2.0574	0.2655	-0.2364	0.0161	0.9105 +	1.6220	1.408
NA	0.3847	0.5196	0.0732	0.0974	0.2290	0.2203	0.3085
CL	0.6294	0.6404	0.1198	0.1196	0.3746	0.3603	0.3800
NO3	0.1398	0.6306	-0.1016	0.1200	0.0191	0.1707	0.3753
SO4	0.3031	0.6330	0.1081	0.1203	0.2056	0.1379	0.3767
NH4	0.0000	0.3925	0.0000	0.0747	0.0000	0.0000	0.2336
Fine Mass Emission Rate (g/kg meat)	7.143	0.884	39.807	1.293	23.475	23.097	1.089

TABLE 6. MEAT COOKING TESTS (CONT.)

	XLEAN, FRIED		REGULAR, FRIED		MEAN	S.D. of MEAN
	TEST 3 (% +- SD)		TEST 4 (% +- SD)			
AL	-0.2363	0.3200	0.1080	0.3801	-0.0642	0.2435
SI	-0.2603	0.2494	-0.2356	0.2482	-0.2480	0.0175
P	0.0025	0.1908	-0.1030	0.2014	-0.0503	0.0746
S	2.9884	1.4275	0.0879	1.2984	1.6381 +	2.0510
CL	1.1681	0.6058	-0.4605	0.5842	0.3538	1.1516
K	0.3601	0.2588	0.3650	0.2630	0.3626 *	0.0035
CA	0.2692	0.1977	0.0281	0.2009	0.1487	0.1705
TI	0.0794	0.0943	-0.1088	0.1009	-0.0147	0.1331
V	-0.0363	0.0602	0.0135	0.0687	-0.0114	0.0352
CR	0.0509	0.0663	0.2464	0.0946	0.1487 +	0.1382
MN	-0.0061	0.0684	0.0879	0.0929	0.0409	0.0665
FE	-0.0293	0.2000	0.5029	0.2478	0.2368 +	0.3763
NI	0.0555	0.0753	0.0432	0.0961	0.0494 *	0.0087
CU	0.6488	0.2621	-0.8310	0.2552	-0.0911 +	1.0464
ZN	0.3225	0.1598	-0.4693	0.1698	-0.0734 +	0.5599
GA	-0.0363	0.0463	-0.0040	0.0546	-0.0202	0.0228
AS	0.0000	0.1565	0.0000	0.1828	0.0000	0.0000
SE	0.0416	0.0604	-0.0289	0.0727	0.0084	0.0499
BR	0.1140	0.0801	0.0529	0.0962	0.0835	0.0432
RB	0.0254	0.1009	0.1555	0.1354	0.0904	0.0920
SR	-0.1834	0.1269	0.1758	0.1483	0.0062	0.2399
Y	-0.0484	0.1427	0.1888	0.1845	0.0702	0.1677
ZR	0.0000	0.6168	0.0000	0.7821	0.0000	0.0000
MO	0.0000	0.3959	0.4820	0.5212	0.2410	0.3408
PD	-0.2602	0.4379	0.0000	0.5589	-0.1301	0.1840
AG	0.4561	0.5573	0.0416	0.7039	0.2488	0.2931
CD	-0.0016	0.6513	0.0000	0.7831	-0.0008	0.0011
IN	-0.4299	0.8623	1.1559	1.1200	0.3630	1.1213
SN	0.3286	1.0593	-0.3933	1.3038	-0.0324	0.5105
SB	-1.3677	2.2085	0.2673	2.8624	-0.5502	1.1561
BA	0.4854	4.2187	0.4259	5.2693	0.4557 *	0.0421
LA	5.7882	7.9918	-1.1754	9.4901	2.3084	4.9240
HG	-0.1997	0.1456	0.0000	0.1609	-0.0998	0.1412
PB	0.4286	0.2877	-0.0253	0.3202	0.2017	0.3210
EC	-12.2821	17.9653	0.1460	16.9964	-6.0880	8.7880
OC	56.8546	26.9909	57.8640	23.5139	57.3593 **	0.7140
Backup filter OC	20.0348	21.3972	25.1468	21.2651	22.5908 *	3.6147
HG	0.1786	0.4210	-7.8175	1.1164	-3.8195	5.6541
NA	2.1473	2.9345	-1.2441	2.8692	0.4516	2.3981
CL	3.5134	3.6608	3.5185	3.5497	3.5160 *	0.0034
NO3	3.5134	3.6408	0.6520	3.4932	2.0827	2.0233
SO4	0.1302	3.4988	1.6944	3.5048	0.8123	1.1061
NH4	0.0000	2.2434	0.0000	2.1726	0.0000	0.0000
Fine Mass Emission Rate (g/kg meat)	1.406	0.386	1.176	0.156	1.291	0.163

E-759-M8

TABLE 7. CIGARETTES

	"LIGHT"		REGULAR		MENTHOL		FILTERTIP		MEAN	S.D. of MEAN		
	TEST 1 (% +- SD)		TEST 2 (% +- SD)		TEST 3 (% +- SD)		TEST 4 (% +- SD)					
AL	0.0044	0.0025	0.0118	0.0030	0.0095	0.0036	0.0029	0.0025	0.0072	**	0.0024	
SI	0.0009	0.0015	0.0030	0.0018	-0.0044	0.0022	0.0009	0.0016	0.0001		0.0018	
P	0.0056	0.0018	0.0033	0.0018	0.0110	0.0027	0.0058	0.0019	0.0064	**	0.0019	
S	0.1343	0.0108	0.1501	0.0125	0.1387	0.0155	0.1282	0.0114	0.1378	**	0.0053	
CL	0.2750	0.0158	0.1994	0.0125	0.2510	0.0167	0.1905	0.0119	0.2290	**	0.0235	
K	0.4269	0.0223	0.4411	0.0233	0.3719	0.0207	0.4065	0.0214	0.4116	**	0.0173	
CA	0.0025	0.0024	-0.0013	0.0025	-0.0012	0.0027	-0.0002	0.0023	-0.0001		0.0010	
TI	-0.0003	0.0004	0.0002	0.0005	-0.0007	0.0006	0.0014	0.0005	0.0001		0.0005	
V	-0.0002	0.0003	0.0000	0.0003	0.0000	0.0005	-0.0001	0.0003	-0.0001		0.0001	
CR	-0.0002	0.0004	-0.0001	0.0004	-0.0001	0.0005	0.0004	0.0004	0.0000		0.0002	
MN	-0.0004	0.0004	-0.0003	0.0005	-0.0003	0.0006	0.0003	0.0004	-0.0002		0.0002	
FE	0.0003	0.0009	-0.0004	0.0011	-0.0005	0.0015	0.0006	0.0010	0.0000		0.0003	
NI	0.0000	0.0004	0.0000	0.0004	-0.0002	0.0005	0.0000	0.0004	0.0000		0.0001	
CU	0.0193	0.0018	0.0118	0.0012	-0.0026	0.0009	0.0050	0.0007	0.0084	+	0.0054	
ZN	0.0134	0.0012	0.0076	0.0008	-0.0018	0.0005	0.0037	0.0005	0.0057	+	0.0037	
GA	-0.0001	0.0002	0.0001	0.0003	0.0005	0.0004	0.0000	0.0002	0.0001		0.0002	
AS	0.0000	0.0008	0.0000	0.0009	0.0000	0.0012	0.0002	0.0009	0.0000		0.0001	
SE	0.0001	0.0003	0.0002	0.0004	0.0000	0.0005	0.0000	0.0003	0.0001		0.0001	
BR	0.0028	0.0005	0.0017	0.0005	0.0030	0.0007	0.0026	0.0005	0.0025	**	0.0003	
RB	-0.0002	0.0006	0.0007	0.0007	0.0007	0.0010	0.0001	0.0006	0.0003		0.0003	
SR	-0.0005	0.0006	0.0005	0.0008	0.0002	0.0011	0.0001	0.0007	0.0001		0.0002	
Y	-0.0007	0.0008	0.0002	0.0009	0.0015	0.0013	0.0006	0.0009	0.0004		0.0005	
ZR	0.0010	0.0035	0.0060	0.0039	0.0000	0.0058	0.0010	0.0038	0.0020		0.0016	
MO	0.0004	0.0025	0.0000	0.0027	-0.0019	0.0039	0.0004	0.0027	-0.0003		0.0006	
PD	0.0000	0.0023	-0.0007	0.0028	-0.0035	0.0041	0.0021	0.0028	-0.0005		0.0013	
AG	-0.0029	0.0029	-0.0001	0.0034	-0.0016	0.0048	0.0007	0.0033	-0.0010		0.0009	
CD	-0.0004	0.0035	0.0036	0.0041	0.0058	0.0059	0.0000	0.0038	0.0022		0.0017	
IN	-0.0032	0.0046	-0.0037	0.0052	0.0049	0.0076	-0.0002	0.0050	-0.0005		0.0023	
SN	-0.0043	0.0058	0.0022	0.0065	0.0090	0.0092	-0.0041	0.0062	0.0007		0.0036	
SB	-0.0027	0.0112	0.0000	0.0124	-0.0030	0.0180	-0.0034	0.0123	-0.0023		0.0009	
BA	0.0000	0.0270	-0.0114	0.0304	-0.0097	0.0429	-0.0146	0.0293	-0.0089		0.0036	
LA	0.0000	0.0384	-0.0077	0.0446	0.0413	0.0642	0.0000	0.0432	0.0084		0.0128	
HG	0.0000	0.0007	0.0007	0.0009	0.0000	0.0011	0.0000	0.0008	0.0002		0.0002	
PB	0.0020	0.0014	-0.0006	0.0017	-0.0018	0.0022	0.0002	0.0016	0.0000		0.0009	
EC	0.6913	0.1349	0.3086	0.0862	0.6048	0.1907	0.3411	0.0888	0.4864	**	0.1099	
OC	63.1748	3.2618	61.0223	3.1212	57.7938	3.2196	56.0128	2.8972	59.5009	**	1.8527	
Backup filter	OC	3.5247	0.2824	2.1653	0.1783	3.8838	0.2772	2.2589	0.1532	2.9582	**	0.5050
	MG++	-0.0447	0.0031	0.0320	0.0014	0.0064	0.0024	0.0308	0.0013	0.0061	+	0.0207
	NA+	-0.0193	0.0214	0.0068	0.0094	0.0302	0.0166	0.0200	0.0090	0.0094		0.0124
	CL-	0.2869	0.0263	0.2693	0.0136	0.3125	0.0347	0.2687	0.0130	0.2844	**	0.0119
	NO3-	0.0403	0.0263	0.0813	0.0121	0.0867	0.0236	0.0768	0.0116	0.0713	**	0.0121
	SO4=	-0.0056	0.0264	0.0699	0.0120	0.0921	0.0225	0.0778	0.0115	0.0586	**	0.0253
	NH4+	0.0338	0.0062	0.0458	0.0084	0.0383	0.0145	0.0434	0.0029	0.0403	**	0.0031
Fine Mass Emission Rate (mg/cigarette)	14.10	0.20	21.84	0.20	23.11	0.20	22.37	0.20	20.36		2.42	

TABLE 8. VEGETATIVE DETRITUS

	GREEN VEGETATION		GREEN VEGETATION		DEAD VEGETATION		DEAD VEGETATION		MEAN	S.D. of MEAN	
	TEST 1 (% +/- SD)		TEST 2 (% +/- SD)		TEST 3 (% +/- SD)		TEST 4 (% +/- SD)				
AL	3.1355	0.2724	2.2211	0.2072	2.4920	0.2283	2.4267	0.2242	2.5691	**	0.2283
SI	8.7768	0.9493	5.8321	0.6321	9.7066	1.0496	9.0923	0.9844	8.3620	**	0.9252
P	0.3179	0.0342	0.3849	0.0374	0.2666	0.0292	0.2491	0.0294	0.3046	**	0.0352
S	0.6694	0.0503	0.5148	0.0903	0.6934	0.0446	0.5948	0.0617	0.6181	**	0.0466
CL	0.3621	0.0263	0.3934	0.0396	0.2789	0.0193	0.2773	0.0298	0.3279	**	0.0340
K	2.2806	0.1179	1.5814	0.0884	1.4781	0.0765	1.3555	0.0770	1.6739	**	0.2395
CA	2.1881	0.1137	2.0292	0.1091	2.5422	0.1302	2.3945	0.1273	2.2885	**	0.1303
TI	0.2999	0.0319	0.2475	0.0160	0.2884	0.0156	0.2426	0.0156	0.2668	**	0.0146
V	0.0084	0.0107	0.0226	0.0047	0.0237	0.0037	0.0153	0.0046	0.0175	**	0.0041
CR	0.0449	0.0036	0.1138	0.0082	0.0217	0.0019	0.0340	0.0040	0.0536	**	0.0238
MN	0.0751	0.0047	0.0607	0.0057	0.0526	0.0033	0.0546	0.0046	0.0608	**	0.0059
FE	3.6660	0.1861	2.3733	0.1239	2.7105	0.1374	2.3129	0.1206	2.7657	**	0.3610
NI	0.0375	0.0032	0.2063	0.0135	0.0104	0.0013	0.0371	0.0043	0.0728	+	0.0519
CU	0.2839	0.0154	8.4682	0.4302	0.0786	0.0047	0.1813	0.0117	2.2530	+	2.3927
ZN	0.1987	0.0111	4.8962	0.2519	0.1074	0.0061	0.1635	0.0104	1.3414	+	1.3684
GA	0.0001	0.0011	0.0000	0.0085	0.0000	0.0007	0.0000	0.0015	0.0000		0.0000
AS	0.0033	0.0063	0.0016	0.0302	0.0021	0.0034	0.0012	0.0055	0.0021	*	0.0005
SE	0.0022	0.0011	0.0038	0.0022	0.0014	0.0007	0.0046	0.0018	0.0030	**	0.0008
BR	0.0046	0.0013	0.0101	0.0028	0.0065	0.0010	0.0074	0.0025	0.0072	**	0.0013
RB	0.0100	0.0020	0.0082	0.0038	0.0056	0.0013	0.0071	0.0034	0.0077	**	0.0011
SR	0.0294	0.0028	0.0286	0.0047	0.0219	0.0019	0.0224	0.0040	0.0256	**	0.0023
Y	0.0000	0.0026	0.0000	0.0057	0.0000	0.0018	0.0089	0.0046	0.0022		0.0026
ZR	0.0000	0.0111	0.0000	0.0239	0.0000	0.0075	0.0000	0.0212	0.0000		0.0000
MO	0.0142	0.0075	0.0000	0.0151	0.0000	0.0051	0.0239	0.0132	0.0095		0.0067
PD	0.0124	0.0080	0.0000	0.0148	0.0086	0.0054	0.0291	0.0147	0.0125		0.0070
AG	0.0070	0.0091	0.8371	0.0588	0.0071	0.0064	0.1206	0.0224	0.2430	+	0.2308
CD	0.0086	0.0109	0.0195	0.0220	0.0126	0.0075	0.0377	0.0199	0.0196	*	0.0074
IN	0.0248	0.0145	0.0321	0.0286	0.0070	0.0097	0.0184	0.0248	0.0206	*	0.0061
SN	0.0033	0.0172	0.0447	0.0396	0.0183	0.0117	0.0206	0.0304	0.0217	*	0.0099
SB	0.0561	0.0360	0.0340	0.0695	0.0087	0.0231	0.0285	0.0613	0.0318	*	0.0113
BA	0.6204	0.1062	0.2119	0.1742	0.1469	0.0592	0.2715	0.1506	0.3127	**	0.1220
LA	0.1195	0.1218	0.2670	0.2431	0.0000	0.0786	0.1804	0.2135	0.1417	*	0.0648
HG	0.0022	0.0025	0.0060	0.0053	0.0024	0.0018	0.0000	0.0037	0.0027		0.0014
PB	0.0867	0.0078	0.5585	0.0327	0.0405	0.0045	0.0531	0.0089	0.1847	+	0.1443
EC	---	---	0.6777	0.3756	1.1820	0.3834	0.9743	0.7215	0.9447	*	0.1792
OC	---	---	29.5666	1.8266	31.4754	1.9010	36.0197	2.4736	32.3539	**	2.3441
Backup filter OC	---	---	2.9844	0.5388	2.6191	0.5076	3.2989	0.8474	2.9675	**	0.2406
NG++	---	---	0.4593	0.0105	0.1884	0.0154	0.8465	0.0211	0.4981	**	0.2339
NA+	---	---	0.0000	0.0725	0.1433	0.0683	0.0000	0.1447	0.0478		0.0585
CL-	---	---	0.1319	0.0892	0.1242	0.0841	0.0000	0.1778	0.0854		0.0523
NO3-	---	---	0.4198	0.1833	0.4679	0.0875	0.2456	0.1779	0.3778	**	0.0827
SO4=	---	---	0.4198	0.1503	0.5342	0.0882	0.2105	0.1775	0.3882	**	0.1161
NH4+	---	---	0.0571	0.0237	0.0000	0.0828	0.0000	0.0380	0.0180		0.0233

TABLE 9. OTHER SOURCES

	SYNTHETIC LOG FIRE		PAVED ROAD DUST		BRAKE DUST		TIRE DUST		TAR POT EMISSIONS	
	TEST 1 (% +/- SD)		TEST 1 (% +/- SD)		TEST 1 (% +/- SD)		TEST 1 (% +/- SD)		TEST 1 (% +/- SD)	
AL	0.2573	0.0244+	5.8933	0.9086+	0.0330	0.0213	0.0465	0.0106	0.0180	0.0019+
SI	0.0580	0.0080+	12.4109	1.9479+	6.7911	0.7343+	0.1752	0.0194	0.0171	0.0020+
P	0.0336	0.0213	0.0716	0.0181+	0.0000	0.0059	0.0000	0.0035	0.0000	0.0013
S	0.1084	0.0259+	0.5648	0.0556+	1.2846	0.0871+	0.1110	0.0246	0.3621	0.0202+
CL	0.5196	0.0328+	0.1710	0.0186+	0.1459	0.0169+	0.0521	0.0117	0.7280	0.0384+
K	0.1868	0.0126+	1.8740	0.2426+	0.0194	0.0070+	0.0379	0.0063	0.0011	0.0006
CA	0.0054	0.0033	4.4384	0.2438+	0.1144	0.0100+	0.2029	0.0138	0.0004	0.0004
TI	0.0017	0.0016	0.5630	0.0675+	0.3644	0.1852	0.0558	0.0048	0.0000	0.0002
V	0.0005	0.0011	0.0270	0.0080+	0.0660	0.0660	0.0000	0.0015	0.0001	0.0001
CR	0.0020	0.0013	0.0174	0.0025+	0.1209	0.0605	0.0027	0.0013	0.0002	0.0002
HM	0.0097	0.0017+	0.1186	0.0092+	0.1707	0.0092+	0.0098	0.0017	0.0000	0.0002
FE	0.0221	0.0040+	6.2336	0.6551+	11.5016	0.5786+	0.4635	0.0260	0.0013	0.0004
MI	0.0021	0.0013	0.0121	0.0013+	0.0657	0.0037+	0.0048	0.0015	0.0003	0.0002
CU	0.4400	0.0233+	0.0562	0.0416	0.0372	0.0023+	0.0487	0.0040	0.0072	0.0005+
ZN	-0.0003	0.0026	0.1535	0.0301+	0.0271	0.0016+	0.0433	0.0035	0.0045	0.0004+
GA	0.0000	0.0011	0.0000	0.0008	0.0005	0.0003	0.0015	0.0010	0.0001	0.0001
AS	-0.0015	0.0030	0.0021	0.0058	0.0013	0.0014	0.0000	0.0029	0.0002	0.0004
SE	-0.0003	0.0011	0.0007	0.0008	0.0020	0.0005	0.0023	0.0012	0.0002	0.0001
BR	0.0015	0.0015	0.0049	0.0009+	0.0043	0.0006+	0.0023	0.0013	0.0004	0.0002
RB	-0.0005	0.0018	0.0133	0.0023+	0.0047	0.0009+	0.0002	0.0019	0.0000	0.0003
SR	0.0000	0.0022	0.1276	0.0068+	0.0744	0.0039+	0.0037	0.0023	0.0003	0.0003
Y	0.0000	0.0028	0.0026	0.0039	0.0000	0.0012	0.0000	0.0029	0.0004	0.0004
ZR	0.0000	0.0121	0.0000	0.0090	0.0000	0.0062	0.0000	0.0125	0.0025	0.0015
MD	0.0000	0.0077	0.0046	0.0038	0.0049	0.0035	0.0008	0.0081	0.0011	0.0011
PD	0.0000	0.0076	0.0010	0.0055	0.0000	0.0035	0.0038	0.0085	0.0000	0.0011
AG	0.0000	0.0108	0.0021	0.0151	0.0000	0.0040	0.0185	0.0106	0.0006	0.0013
CD	0.0000	0.0133	0.0023	0.0057	0.0061	0.0053	0.0067	0.0121	0.0000	0.0016
IN	0.0022	0.0169	-0.0007	0.0079	0.0000	0.0064	0.0000	0.0154	0.0043	0.0022
SW	-0.0056	0.0202	-0.0001	0.0091	0.0000	0.0077	0.0044	0.0190	0.0001	0.0025
SB	0.0000	0.0448	-0.0005	0.0186	0.0022	0.0150	0.0821	0.0413	0.0000	0.0050
BA	-0.0117	0.0869	0.0755	0.0641	7.4435	0.6678+	0.0373	0.0921	0.0041	0.0122
LA	-0.0772	0.1531	-0.0020	0.0587	0.0000	0.0519	0.2646	0.1390	0.0000	0.0175
HG	0.0016	0.0014	0.0011	0.0021	0.0000	0.0012	0.0046	0.0031	0.0000	0.0003
PB	0.0000	0.0052	0.1068	0.0076+	0.0061	0.0022+	0.0162	0.0052	0.0007	0.0006
EC	12.5190	0.8273+	1.0595	0.2332+	2.6138	0.2547+	15.2691	2.8926+	0.0126	0.0252
OC	57.0253	3.0726+	13.5087	1.0050+	10.6767	0.6586+	35.9824	7.3612+	60.3394	5.3635+
Backup filter DC	3.5312	0.4392+	0.6487	0.1189+	0.5150	0.1346+	----	----	0.8024	0.3607+
MG++	-0.0131	0.0066	0.1718	0.0132+	8.3026	0.6215+	0.0358	0.0125+	0.0000	0.0010
NA+	0.0321	0.0451	0.1481	0.0243+	-0.0077	0.0392	0.0683	0.0332+	0.0111	0.0059
CL-	0.2914	0.0570+	0.1454	0.0239+	0.1481	0.0272+	0.0603	0.0171+	0.7042	0.0142+
NO3-	0.0039	0.0550	0.2454	0.0239+	0.1628	0.0373+	0.1529	0.0218+	0.0119	0.0073
SO4=	-0.0709	0.0557	1.2037	0.1063+	3.3419	0.2848+	0.2530	0.0510+	0.0905	0.0081+
NH4+	0.0385	0.0353	0.0534	0.0190+	0.0034	0.0071	0.0190	0.0050+	0.3440	0.0128+
Fine Mass Emission Rate (g/kg wood)	12.0472	0.0448+								