

Measurement of Space-Heating Emissions

Appendix A

PM_{2.5} Laboratory Results

DRAFT

Appliance:	Pellet Stove	Burn Rate:	High	Run #:	1
Fuel:	Alaskan Pellets	Date:	3/8/2011		

Filter Information:

T1 ID #:	A7518110
T1 Flow Rate [mL/min]:	4887
T1 Sample Volume [dsft ³]:	20.67
Q1 ID #:	A7518410
Q1 Flow Rate [mL/min]:	1026
Q1 Sample Volume [dsft ³]:	4.34

Run Information:

Test Duration [min]:	120
Tunnel Flow [dsft ³ /min]:	470.8448
Barometric Pressure [in Hg]:	30.12
Temperature [°F]:	73
Avg Delta H [in H2O]:	0.45
Burn Rate [kg/hr]:	2.23

Teflon Sample:	Catch [µg]:	Emission Rate [g/hr]
Total PM _{2.5}	2422.00	3.311E+00
K ⁺	876.88	1.199E+00
Na ⁺	7.53	1.030E-02
NH ₄ ⁺	0.00	0.000E+00
NO ₃	25.38	3.469E-02
SO ₄	299.55	4.095E-01
Silver	0.09	1.237E-04
Aluminum	0.00	0.000E+00
Arsenic	0.00	0.000E+00
Barium	0.07	9.242E-05
Bromine	0.14	1.893E-04
Calcium	2.13	2.912E-03
Cadmium	0.00	0.000E+00
Cerium	0.06	8.195E-05
Chlorine	36.28	4.960E-02
Cobalt	0.11	1.531E-04
Chromium	0.17	2.377E-04
Cesium	0.00	0.000E+00
Copper	0.69	9.416E-04
Iron	0.40	5.460E-04
Indium	0.00	0.000E+00
Potassium	922.77	1.261E+00
Magnesium	0.81	1.108E-03
Manganese	1.07	1.465E-03
Sodium	30.97	4.233E-02
Nickel	0.04	5.612E-05
Phosphorous	0.00	0.000E+00
Lead	0.16	2.126E-04
Rubidium	1.64	2.246E-03
Sulfur	106.04	1.449E-01
Antimony	0.00	0.000E+00
Selenium	0.00	0.000E+00
Silicon	0.00	0.000E+00
Tin	0.00	0.000E+00
Strontium	0.02	2.634E-05
Titanium	0.02	3.250E-05
Vanadium	0.00	0.000E+00
Zinc	39.89	5.453E-02
Zirconium	0.00	0.000E+00

Quartz Sample:	Catch [µg]:	Emission Rate [g/hr]
Elemental Carbon	48.39	3.151E-01
Organic Carbon	59.09	3.847E-01

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Appliance:	EPA Wood Stove	Burn Rate:	High	Run #:	2
Fuel:	Birch	Date:	3/9/2011		

Filter Information:

T1 ID #:	A751810N
T1 Flow Rate [mL/min]:	5697
T1 Sample Volume [dsft ³]:	21.94
Q1 ID #:	A751856I
Q1 Flow Rate [mL/min]:	1039
Q1 Sample Volume [dsft ³]:	4.00

Run Information:

Test Duration [min]:	110
Tunnel Flow [dsft ³ /min]:	459.4511
Barometric Pressure [in Hg]:	30.09
Temperature [°F]:	76
Avg Delta H [in H2O]:	0.44
Burn Rate [kg/hr]:	3.76

Teflon Sample:	Catch [µg]:	Emission Rate [g/hr]
Total PM_{2.5}	1461.00	1.836E+00
K ⁺	73.04	9.178E-02
Na ⁺	0.67	8.479E-04
NH ₄ ⁺	0.23	2.943E-04
NO ₃	15.71	1.974E-02
SO ₄	46.62	5.858E-02
Silver	0.00	0.000E+00
Aluminum	0.00	0.000E+00
Arsenic	0.00	0.000E+00
Barium	0.06	7.462E-05
Bromine	0.25	3.170E-04
Calcium	1.64	2.065E-03
Cadmium	0.01	1.420E-05
Cerium	0.00	0.000E+00
Chlorine	38.85	4.882E-02
Cobalt	0.05	6.428E-05
Chromium	0.08	9.780E-05
Cesium	0.00	0.000E+00
Copper	0.02	2.847E-05
Iron	0.41	5.092E-04
Indium	0.05	5.681E-05
Potassium	84.55	1.062E-01
Magnesium	1.43	1.799E-03
Manganese	0.21	2.670E-04
Sodium	29.74	3.738E-02
Nickel	0.04	4.473E-05
Phosphorous	0.00	0.000E+00
Lead	0.10	1.280E-04
Rubidium	0.14	1.762E-04
Sulfur	17.99	2.260E-02
Antimony	0.00	0.000E+00
Selenium	0.04	4.692E-05
Silicon	3.03	3.805E-03
Tin	0.00	0.000E+00
Strontium	0.00	4.264E-06
Titanium	0.03	3.877E-05
Vanadium	0.00	0.000E+00
Zinc	37.16	4.669E-02
Zirconium	0.00	0.000E+00

Quartz Sample:	Catch [µg]:	Emission Rate [g/hr]
Elemental Carbon	155.30	1.070E+00
Organic Carbon	73.97	5.097E-01

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Appliance:	EPA Wood Stove	Burn Rate:	High	Run #:	3
Fuel:	Spruce	Date:	3/10/2011		

Filter Information:	
T1 ID #:	A751809U
T1 Flow Rate [mL/min]:	5445
T1 Sample Volume [dsft ³]:	17.19
Q1 ID #:	A7518550
Q1 Flow Rate [mL/min]:	1043
Q1 Sample Volume [dsft ³]:	3.29

Run Information:	
Test Duration [min]:	90
Tunnel Flow [dsft ³ /min]:	461.2901
Barometric Pressure [in Hg]:	29.93
Temperature [°F]:	72
Avg Delta H [in H2O]:	0.45
Burn Rate [kg/hr]	4.27

Teflon Sample:	Catch [µg]:	Emission Rate [g/hr]
Total PM _{2.5}	728.00	1.172E+00
K ⁺	62.52	1.006E-01
Na ⁺	0.77	1.235E-03
NH ₄ ⁺	0.01	2.353E-05
NO ₃	14.41	2.320E-02
SO ₄	41.13	6.620E-02
Silver	0.00	0.000E+00
Aluminum	0.00	0.000E+00
Arsenic	0.02	3.459E-05
Barium	0.02	3.296E-05
Bromine	0.09	1.420E-04
Calcium	1.27	2.048E-03
Cadmium	0.00	0.000E+00
Cerium	0.00	0.000E+00
Chlorine	18.44	2.969E-02
Cobalt	0.01	2.407E-05
Chromium	0.04	6.997E-05
Cesium	0.00	0.000E+00
Copper	0.06	1.039E-04
Iron	0.14	2.317E-04
Indium	0.00	0.000E+00
Potassium	72.61	1.169E-01
Magnesium	0.63	1.016E-03
Manganese	0.10	1.539E-04
Sodium	11.53	1.856E-02
Nickel	0.10	1.631E-04
Phosphorous	0.00	0.000E+00
Lead	0.03	4.187E-05
Rubidium	0.07	1.092E-04
Sulfur	16.56	2.665E-02
Antimony	0.00	0.000E+00
Selenium	0.00	3.642E-06
Silicon	1.24	1.992E-03
Tin	0.00	0.000E+00
Strontium	0.00	0.000E+00
Titanium	0.00	1.832E-06
Vanadium	0.00	0.000E+00
Zinc	15.21	2.448E-02
Zirconium	0.01	9.097E-06

Quartz Sample:	Catch [µg]:	Emission Rate [g/hr]
Elemental Carbon	31.19	2.621E-01
Organic Carbon	71.00	5.966E-01

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Appliance:	EPA Wood Stove	Burn Rate:	Low	Run #:	5
Fuel:	Birch	Date:	3/17/2011		

Filter Information:

T1 ID #:	A751977 & A751801M
T1 Flow Rate [mL/min]:	2555
T1 Sample Volume [dsft³]:	22.63
Q1 ID #:	A751853Y
Q1 Flow Rate [mL/min]:	1073
Q1 Sample Volume [dsft³]:	9.50

Run Information:

Test Duration [min]:	250
Tunnel Flow [dsft³/min]:	464.6459
Barometric Pressure [in Hg]:	30.11
Temperature [°F]	70
Avg Delta H [in H2O]:	0.44
Burn Rate [kg/hr]	1.5

Teflon Sample:	Catch [µg]:	Emission Rate [g/hr]
Total PM _{2.5}	4965.00	6.117E+00
K ⁺	78.20	9.634E-02
Na ⁺	1.09	1.340E-03
NH ₄ ⁺	0.52	6.446E-04
NO ₃	4.81	5.931E-03
SO ₄	37.08	4.568E-02
Silver	0.00	0.000E+00
Aluminum	0.40	4.942E-04
Arsenic	0.00	0.000E+00
Barium	0.12	1.500E-04
Bromine	0.09	1.059E-04
Calcium	1.17	1.447E-03
Cadmium	0.00	0.000E+00
Cerium	0.00	0.000E+00
Chlorine	11.12	1.370E-02
Cobalt	0.03	3.323E-05
Chromium	0.13	1.552E-04
Cesium	0.07	8.559E-05
Copper	0.08	9.485E-05
Iron	0.61	7.476E-04
Indium	0.23	2.785E-04
Potassium	89.53	1.103E-01
Magnesium	0.64	7.912E-04
Manganese	0.17	2.143E-04
Sodium	9.15	1.128E-02
Nickel	0.05	6.768E-05
Phosphorous	0.00	0.000E+00
Lead	0.01	1.115E-05
Rubidium	0.15	1.894E-04
Sulfur	20.43	2.517E-02
Antimony	0.00	0.000E+00
Selenium	0.00	0.000E+00
Silicon	0.00	0.000E+00
Tin	0.08	9.747E-05
Strontium	0.03	3.343E-05
Titanium	0.00	0.000E+00
Vanadium	0.04	4.347E-05
Zinc	18.32	2.257E-02
Zirconium	0.00	0.000E+00

Quartz Sample:	Catch [µg]:	Emission Rate [g/hr]
Elemental Carbon	396.68	1.164E+00
Organic Carbon	4408.43	1.293E+01

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Appliance:	EPA Wood Stove	Burn Rate:	Low	Run #:	6
Fuel:	Spruce	Date:	3/18/2011		

Filter Information:

T1 ID #:	A751807S
T1 Flow Rate [mL/min]:	815
T1 Sample Volume [dsft ³]:	5.98
Q1 ID #:	A751842V
Q1 Flow Rate [mL/min]:	960
Q1 Sample Volume [dsft ³]:	7.05

Run Information:

Test Duration [min]:	210
Tunnel Flow [dsft ³ /min]:	477.7275
Barometric Pressure [in Hg]:	29.94
Temperature [°F]:	74
Avg Delta H [in H ₂ O]:	0.42
Burn Rate [kg/hr]:	1.77

Teflon Sample:	Catch [µg]:	Emission Rate [g/hr]
Total PM_{2.5}	351.00	1.681E+00
K ⁺	2.60	1.247E-02
Na ⁺	0.21	1.021E-03
NH ₄ ⁺	0.06	2.808E-04
NO ₃	1.49	7.149E-03
SO ₄	1.73	8.295E-03
Silver	0.00	0.000E+00
Aluminum	0.10	4.904E-04
Arsenic	0.00	0.000E+00
Barium	0.01	4.878E-05
Bromine	0.01	5.251E-05
Calcium	0.41	1.982E-03
Cadmium	0.00	0.000E+00
Cerium	0.00	0.000E+00
Chlorine	0.82	3.912E-03
Cobalt	0.00	1.733E-05
Chromium	0.01	4.279E-05
Cesium	0.01	2.710E-05
Copper	0.00	0.000E+00
Iron	0.03	1.327E-04
Indium	0.00	0.000E+00
Potassium	2.84	1.359E-02
Magnesium	0.00	0.000E+00
Manganese	0.02	1.078E-04
Sodium	0.00	0.000E+00
Nickel	0.06	2.724E-04
Phosphorous	0.00	0.000E+00
Lead	0.01	3.789E-05
Rubidium	0.00	0.000E+00
Sulfur	0.84	4.047E-03
Antimony	0.00	0.000E+00
Selenium	0.00	0.000E+00
Silicon	0.00	0.000E+00
Tin	0.00	0.000E+00
Strontium	0.01	6.496E-05
Titanium	0.00	0.000E+00
Vanadium	0.00	0.000E+00
Zinc	0.29	1.397E-03
Zirconium	0.00	0.000E+00

Quartz Sample:	Catch [µg]:	Emission Rate [g/hr]
Elemental Carbon	41.62	1.693E-01
Organic Carbon	321.87	1.309E+00

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Appliance:	EPA OWHH	Burn Rate:	High	Run #:	8
Fuel:	Birch	Date:	3/22/2011		

Filter Information:

T1 ID #:	A751804P
T1 Flow Rate [mL/min]:	923.86
T1 Sample Volume [dsft ³]:	7.98
Q1 ID #:	A7518521X
Q1 Flow Rate [mL/min]:	1068.9
Q1 Sample Volume [dsft ³]:	9.23

Run Information:

Test Duration [min]:	243
Tunnel Flow [dsft ³ /min]:	468.0051
Barometric Pressure [in Hg]:	30.1
Temperature [°F]:	68
Avg Delta H [in H2O]:	0.45
Burn Rate [kg/hr]:	13.29

Teflon Sample:	Catch [µg]:	Emission Rate [g/hr]
Total PM_{2.5}	3048.00	1.072E+01
K ⁺	360.13	1.267E+00
Na ⁺	3.58	1.260E-02
NH ₄ ⁺	1.11	3.919E-03
NO ₃	10.06	3.540E-02
SO ₄	204.77	7.204E-01
Silver	0.07	2.387E-04
Aluminum	0.00	0.000E+00
Arsenic	0.00	0.000E+00
Barium	0.39	1.385E-03
Bromine	0.38	1.340E-03
Calcium	7.96	2.802E-02
Cadmium	0.25	8.752E-04
Cerium	0.00	0.000E+00
Chlorine	46.79	1.646E-01
Cobalt	0.07	2.575E-04
Chromium	0.10	3.373E-04
Cesium	0.00	0.000E+00
Copper	0.18	6.375E-04
Iron	0.31	1.081E-03
Indium	0.00	0.000E+00
Potassium	451.88	1.590E+00
Magnesium	4.07	1.433E-02
Manganese	1.02	3.573E-03
Sodium	32.70	1.150E-01
Nickel	0.02	8.393E-05
Phosphorous	0.35	1.226E-03
Lead	0.34	1.201E-03
Rubidium	0.80	2.798E-03
Sulfur	107.14	3.769E-01
Antimony	0.00	0.000E+00
Selenium	0.03	1.197E-04
Silicon	0.00	0.000E+00
Tin	0.00	0.000E+00
Strontium	0.07	2.550E-04
Titanium	0.00	0.000E+00
Vanadium	0.00	0.000E+00
Zinc	60.01	2.111E-01
Zirconium	0.00	0.000E+00

Quartz Sample:	Catch [µg]:	Emission Rate [g/hr]
Elemental Carbon	297.08	9.034E-01
Organic Carbon	1688.39	5.134E+00

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Appliance:	EPA OWHH	Burn Rate:	Low	Run #:	9
Fuel:	Birch	Date:	3/22/2011		

Filter Information:	
T1 ID #:	A7518030
T1 Flow Rate [mL/min]:	780.85
T1 Sample Volume [dsft ³]:	17.25
Q1 ID #:	A751851W
Q1 Flow Rate [mL/min]:	875.09
Q1 Sample Volume [dsft ³]:	19.33

Run Information:	
Test Duration [min]:	620
Tunnel Flow [dsft ³ /min]:	494.703
Barometric Pressure [in Hg]:	30.05
Temperature [°F]:	66
Avg Delta H [in H ₂ O]:	0.44
Burn Rate [kg/hr]:	5.29

Teflon Sample:	Catch [µg]:	Emission Rate [g/hr]
Total PM_{2.5}	8178.00	1.407E+01
K ⁺	186.23	3.205E-01
Na ⁺	1.98	3.409E-03
NH ₄ ⁺	1.08	1.863E-03
NO ₃	10.05	1.729E-02
SO ₄	78.32	1.348E-01
Silver	0.02	3.890E-05
Aluminum	0.00	0.000E+00
Arsenic	0.00	0.000E+00
Barium	0.08	1.381E-04
Bromine	0.16	2.823E-04
Calcium	4.72	8.114E-03
Cadmium	0.00	0.000E+00
Cerium	0.00	0.000E+00
Chlorine	31.88	5.486E-02
Cobalt	0.04	6.895E-05
Chromium	0.09	1.463E-04
Cesium	0.00	0.000E+00
Copper	0.14	2.458E-04
Iron	0.31	5.383E-04
Indium	0.00	0.000E+00
Potassium	219.45	3.777E-01
Magnesium	1.47	2.538E-03
Manganese	0.21	3.639E-04
Sodium	14.91	2.566E-02
Nickel	0.01	1.386E-05
Phosphorous	0.00	0.000E+00
Lead	0.11	1.850E-04
Rubidium	0.24	4.087E-04
Sulfur	43.69	7.518E-02
Antimony	0.00	0.000E+00
Selenium	0.00	0.000E+00
Silicon	0.00	0.000E+00
Tin	0.00	0.000E+00
Strontium	0.05	8.563E-05
Titanium	0.01	9.871E-06
Vanadium	0.00	0.000E+00
Zinc	27.05	4.656E-02
Zirconium	0.02	3.113E-05

Quartz Sample:	Catch [µg]:	Emission Rate [g/hr]
Elemental Carbon	396.68	6.091E-01
Organic Carbon	4408.43	6.769E+00

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Appliance:	EPA OWHH	Burn Rate:	High	Run #:	10
Fuel:	Spruce	Date:	3/23/2011		

Filter Information:

T1 ID #:	A7517988
T1 Flow Rate [mL/min]:	798
T1 Sample Volume [dsft ³]:	6.65
Q1 ID #:	A751850V
Q1 Flow Rate [mL/min]:	1051
Q1 Sample Volume [dsft ³]:	8.76

Run Information:

Test Duration [min]:	237
Tunnel Flow [dsft ³ /min]:	462.0291
Barometric Pressure [in Hg]:	29.76
Temperature [°F]:	68
Avg Delta H [in H ₂ O]:	0.48
Burn Rate [kg/hr]	13.31

Teflon Sample:	Catch [µg]:	Emission Rate [g/hr]
Total PM _{2.5}	1228.00	5.120E+00
K ⁺	248.29	1.035E+00
Na ⁺	2.72	1.135E-02
NH ₄ ⁺	-0.73	-3.054E-03
NO ₃	10.25	4.272E-02
SO ₄	150.09	6.258E-01
Silver	0.00	0.000E+00
Aluminum	0.00	0.000E+00
Arsenic	0.05	1.937E-04
Barium	0.87	3.617E-03
Bromine	0.25	1.025E-03
Calcium	32.02	1.335E-01
Cadmium	0.00	0.000E+00
Cerium	0.00	0.000E+00
Chlorine	29.43	1.227E-01
Cobalt	0.05	1.938E-04
Chromium	0.57	2.357E-03
Cesium	0.00	0.000E+00
Copper	0.21	8.814E-04
Iron	1.10	4.577E-03
Indium	0.00	0.000E+00
Potassium	330.54	1.378E+00
Magnesium	4.27	1.781E-02
Manganese	1.25	5.192E-03
Sodium	14.19	5.916E-02
Nickel	0.01	4.222E-05
Phosphorous	1.48	6.157E-03
Lead	0.24	9.917E-04
Rubidium	0.35	1.454E-03
Sulfur	80.65	3.363E-01
Antimony	0.00	0.000E+00
Selenium	0.00	0.000E+00
Silicon	0.00	0.000E+00
Tin	0.00	0.000E+00
Strontium	0.20	8.541E-04
Titanium	0.00	0.000E+00
Vanadium	0.00	1.439E-05
Zinc	22.14	9.232E-02
Zirconium	0.00	0.000E+00

Quartz Sample:	Catch [µg]:	Emission Rate [g/hr]
Elemental Carbon	78.28	2.478E-01
Organic Carbon	623.86	1.975E+00

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Appliance:	EPA OWHH	Burn Rate:	Low	Run #:	11
Fuel:	Spruce	Date:	3/24/2011		

Filter Information:

T1 ID #:	
T1 Flow Rate [mL/min]:	914.5
T1 Sample Volume [dsft³]:	18.79
Q1 ID #:	A751844X
Q1 Flow Rate [mL/min]:	1116.7
Q1 Sample Volume [dsft³]:	22.94

Run Information:

Test Duration [min]:	582
Tunnel Flow [dsft³/min]:	479.7847
Barometric Pressure [in Hg]:	29.72
Temperature [F]	65
Avg Delta H [in H2O]:	0.43
Burn Rate [kg/hr]	5.48

Teflon Sample:	Catch [µg]:	Emission Rate [g/hr]
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Total PM_{2.5}	2819.00	4.319E+00
K ⁺	119.17	1.826E-01
Na ⁺	1.55	2.381E-03
NH ₄ ⁺	0.23	3.555E-04
NO ₃	7.65	1.172E-02
SO ₄	48.75	7.469E-02
Silver	0.00	0.000E+00
Aluminum	0.00	0.000E+00
Arsenic	0.00	0.000E+00
Barium	0.07	1.115E-04
Bromine	0.14	2.079E-04
Calcium	3.72	5.693E-03
Cadmium	0.00	0.000E+00
Cerium	0.00	0.000E+00
Chlorine	20.88	3.199E-02
Cobalt	0.02	3.802E-05
Chromium	0.05	7.213E-05
Cesium	0.00	0.000E+00
Copper	0.08	1.302E-04
Iron	0.17	2.627E-04
Indium	0.00	0.000E+00
Potassium	115.50	1.770E-01
Magnesium	0.75	1.145E-03
Manganese	0.24	3.691E-04
Sodium	11.05	1.693E-02
Nickel	0.02	3.488E-05
Phosphorous	0.00	0.000E+00
Lead	0.07	1.126E-04
Rubidium	0.15	2.252E-04
Sulfur	24.40	3.738E-02
Antimony	0.00	0.000E+00
Selenium	0.00	0.000E+00
Silicon	0.00	0.000E+00
Tin	0.01	1.731E-05
Strontium	0.03	5.196E-05
Titanium	0.00	7.000E-06
Vanadium	0.00	0.000E+00
Zinc	21.28	3.260E-02
Zirconium	0.01	2.078E-05

Quartz Sample:	Catch [µg]:	Emission Rate [g/hr]
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Elemental Carbon	41.62	5.223E-02
Organic Carbon	321.87	4.038E-01

DRAFT

Appliance:	Conventional Wood Stove	Burn Rate:	High	Run #:	12
Fuel:	Spruce	Date:	3/30/2011		

Filter Information:

T1 ID #:	A751826V
T1 Flow Rate [mL/min]:	857.52
T1 Sample Volume [dsft ³]:	1.61
Q1 ID #:	A751840T
Q1 Flow Rate [mL/min]:	901.43
Q1 Sample Volume [dsft ³]:	1.69

Run Information:

Test Duration [min]:	53
Tunnel Flow [dsft ³ /min]:	444.7836
Barometric Pressure [in Hg]:	30.32
Temperature [F]:	75
Avg Delta H [in H2O]:	0.62
Burn Rate [kg/hr]	6.46

Teflon Sample:	Catch [µg]:	Emission Rate [g/hr]
Total PM _{2.5}	174.00	2.890E+00
K ⁺	22.40	3.719E-01
Na ⁺	0.28	4.692E-03
NH ₄ ⁺	0.00	0.000E+00
NO ₃	2.74	4.548E-02
SO ₄	17.49	2.904E-01
Silver	0.00	0.000E+00
Aluminum	0.00	0.000E+00
Arsenic	0.00	0.000E+00
Barium	0.04	6.582E-04
Bromine	0.03	5.631E-04
Calcium	2.90	4.824E-02
Cadmium	0.00	0.000E+00
Cerium	0.00	0.000E+00
Chlorine	3.71	6.165E-02
Cobalt	0.01	1.521E-04
Chromium	0.01	2.424E-04
Cesium	0.00	0.000E+00
Copper	0.00	0.000E+00
Iron	0.63	1.039E-02
Indium	0.00	0.000E+00
Potassium	24.88	4.132E-01
Magnesium	0.54	8.915E-03
Manganese	0.08	1.386E-03
Sodium	2.77	4.593E-02
Nickel	0.01	2.159E-04
Phosphorous	0.00	0.000E+00
Lead	0.05	9.010E-04
Rubidium	0.01	1.126E-04
Sulfur	8.09	1.343E-01
Antimony	0.00	0.000E+00
Selenium	0.00	4.318E-05
Silicon	0.00	0.000E+00
Tin	0.15	2.440E-03
Strontium	0.04	6.194E-04
Titanium	0.00	0.000E+00
Vanadium	0.00	0.000E+00
Zinc	3.29	5.471E-02
Zirconium	0.00	0.000E+00

Quartz Sample:	Catch [µg]:	Emission Rate [g/hr]
Elemental Carbon	23.96	3.785E-01
Organic Carbon	95.09	1.502E+00

DRAFT

Appliance:	Conventional Wood Stove	Burn Rate:	High	Run #:	13
Fuel:	Birch	Date:	3/31/2011		

Filter Information:

T1 ID #:	A751814R & A751825U
T1 Flow Rate [mL/min]:	644.48
T1 Sample Volume [dsft³]:	0.91
Q1 ID #:	A751839O
Q1 Flow Rate [mL/min]:	802.76
Q1 Sample Volume [dsft³]:	1.13

Run Information:

Test Duration [min]:	40
Tunnel Flow [dsft³/min]:	433.3931
Barometric Pressure [in Hg]:	30.32
Temperature [F]:	76
Avg Delta H [in H2O]:	0.59
Burn Rate [kg/hr]:	8.68

Teflon Sample:	Catch [µg]:	Emission Rate [g/hr]
Total PM_{2.5}	3308.00	9.456E+01
K ⁺	30.31	8.663E-01
Na ⁺	0.76	2.175E-02
NH ₄ ⁺	0.20	5.730E-03
NO ₃	5.10	1.457E-01
SO ₄	15.79	4.513E-01
Silver	0.00	0.000E+00
Aluminum	0.00	0.000E+00
Arsenic	0.00	0.000E+00
Barium	0.02	6.475E-04
Bromine	0.06	1.755E-03
Calcium	0.78	2.217E-02
Cadmium	0.00	0.000E+00
Cerium	0.00	0.000E+00
Chlorine	8.63	2.468E-01
Cobalt	0.05	1.442E-03
Chromium	0.04	1.008E-03
Cesium	0.00	0.000E+00
Copper	0.04	1.263E-03
Iron	0.35	9.923E-03
Indium	0.00	0.000E+00
Potassium	43.02	1.230E+00
Magnesium	0.30	8.620E-03
Manganese	0.06	1.756E-03
Sodium	4.87	1.391E-01
Nickel	0.07	1.859E-03
Phosphorous	0.00	0.000E+00
Lead	0.05	1.487E-03
Rubidium	0.03	7.432E-04
Sulfur	12.20	3.486E-01
Antimony	0.00	0.000E+00
Selenium	0.01	2.328E-04
Silicon	0.32	9.244E-03
Tin	0.00	0.000E+00
Strontium	0.02	6.786E-04
Titanium	0.00	0.000E+00
Vanadium	0.00	0.000E+00
Zinc	7.33	2.096E-01
Zirconium	0.00	0.000E+00

Quartz Sample:	Catch [µg]:	Emission Rate [g/hr]
Elemental Carbon	23.96	5.498E-01
Organic Carbon	95.09	2.182E+00

DRAFT

Appliance:	Conventional Wood Stove	Burn Rate:	Low	Run #:	14
Fuel:	Spruce	Date:	4/1/2011		

Filter Information:

T1 ID #:	A751815S
T1 Flow Rate [mL/min]:	756
T1 Sample Volume [dsft ³]:	1.59
Q1 ID #:	A751832T
Q1 Flow Rate [mL/min]:	937
Q1 Sample Volume [dsft ³]:	1.97

Run Information:

Test Duration [min]:	60
Tunnel Flow [dsft ³ /min]:	459.842
Barometric Pressure [in Hg]:	29.96
Temperature [°F]:	74
Avg Delta H [in H2O]:	0.55
Burn Rate [kg/hr]	6.24

Teflon Sample:	Catch [µg]:	Emission Rate [g/hr]
Total PM _{2.5}	757.00	1.316E+01
K ⁺	37.93	6.592E-01
Na ⁺	0.37	6.355E-03
NH ₄ ⁺	0.00	0.000E+00
NO ₃	2.84	4.942E-02
SO ₄	15.78	2.743E-01
Silver	0.00	0.000E+00
Aluminum	0.00	0.000E+00
Arsenic	0.01	1.965E-04
Barium	0.00	0.000E+00
Bromine	0.04	6.680E-04
Calcium	0.29	5.043E-03
Cadmium	0.00	0.000E+00
Cerium	0.00	0.000E+00
Chlorine	4.90	8.518E-02
Cobalt	0.01	1.770E-04
Chromium	0.00	3.152E-05
Cesium	0.00	0.000E+00
Copper	0.00	0.000E+00
Iron	0.04	7.714E-04
Indium	0.00	0.000E+00
Potassium	44.15	7.673E-01
Magnesium	0.01	1.096E-04
Manganese	0.02	4.174E-04
Sodium	1.98	3.441E-02
Nickel	0.00	0.000E+00
Phosphorous	0.00	0.000E+00
Lead	0.02	3.733E-04
Rubidium	0.01	9.824E-05
Sulfur	9.71	1.687E-01
Antimony	0.00	0.000E+00
Selenium	0.00	0.000E+00
Silicon	0.00	0.000E+00
Tin	0.00	0.000E+00
Strontium	0.00	0.000E+00
Titanium	0.00	0.000E+00
Vanadium	0.00	0.000E+00
Zinc	2.76	4.794E-02
Zirconium	0.00	0.000E+00

Quartz Sample:	Catch [µg]:	Emission Rate [g/hr]
Elemental Carbon	131.11	1.839E+00
Organic Carbon	669.43	9.387E+00

DRAFT

Appliance:	Conventional Wood Stove	Burn Rate:	Low	Run #:	15
Fuel:	Birch	Date:	4/1/2011		

Filter Information:

T1 ID #:	A751816T
T1 Flow Rate [mL/min]:	783
T1 Sample Volume [dsft ³]:	1.36
Q1 ID #:	A751836X
Q1 Flow Rate [mL/min]:	997
Q1 Sample Volume [dsft ³]:	1.74

Run Information:

Test Duration [min]:	50
Tunnel Flow [dsft ³ /min]:	446.1507
Barometric Pressure [in Hg]:	29.98
Temperature [°F]:	77
Avg Delta H [in H2O]:	0.55
Burn Rate [kg/hr]:	7.26

Teflon Sample:	Catch [µg]:	Emission Rate [g/hr]
Total PM _{2.5}	2242.00	4.402E+01
K ⁺	36.48	7.163E-01
Na ⁺	0.30	5.808E-03
NH ₄ ⁺	0.00	-2.316E-05
NO ₃	1.52	2.986E-02
SO ₄	14.23	2.795E-01
Silver	0.00	0.000E+00
Aluminum	0.00	0.000E+00
Arsenic	0.01	1.555E-04
Barium	0.00	0.000E+00
Bromine	0.05	8.882E-04
Calcium	0.16	3.225E-03
Cadmium	0.00	0.000E+00
Cerium	0.00	0.000E+00
Chlorine	5.17	1.014E-01
Cobalt	0.01	2.026E-04
Chromium	0.00	0.000E+00
Cesium	0.00	0.000E+00
Copper	0.00	0.000E+00
Iron	0.00	7.350E-05
Indium	0.00	0.000E+00
Potassium	49.03	9.626E-01
Magnesium	0.15	2.968E-03
Manganese	0.06	1.217E-03
Sodium	4.63	9.086E-02
Nickel	0.01	1.891E-04
Phosphorous	0.00	0.000E+00
Lead	0.02	3.553E-04
Rubidium	0.05	8.880E-04
Sulfur	15.10	2.966E-01
Antimony	0.00	0.000E+00
Selenium	0.00	0.000E+00
Silicon	0.00	0.000E+00
Tin	0.00	0.000E+00
Strontium	0.00	0.000E+00
Titanium	0.00	0.000E+00
Vanadium	0.00	0.000E+00
Zinc	7.64	1.501E-01
Zirconium	0.00	0.000E+00

Quartz Sample:	Catch [µg]:	Emission Rate [g/hr]
Elemental Carbon	455.07	7.017E+00
Organic Carbon	1970.65	3.039E+01

DRAFT

Appliance:	Oil Burner	Burn Rate:	Single	Run #:	17
Fuel:	No 2 Fuel Oil	Date:	4/12/2011		

Filter Information:

T1 ID #:	A751818V
T1 Flow Rate [mL/min]:	872.12
T1 Sample Volume [dsft ³]:	15.96
Q1 ID #:	A751833U
Q1 Flow Rate [mL/min]:	1086.6
Q1 Sample Volume [dsft ³]:	19.88

Run Information:

Test Duration [min]:	520
Tunnel Flow [dsft ³ /min]:	487.5126
Barometric Pressure [in Hg]:	30.24
Temperature [°F]:	76
Avg Delta H [in H2O]:	0.45
Burn Rate [kg/hr]	2.14

Teflon Sample:	Catch [µg]:	Emission Rate [g/hr]
Total PM _{2.5}	69.00	1.265E-01
K ⁺	0.27	4.980E-04
Na ⁺	10.30	1.889E-02
NH ₄ ⁺	1.18	2.158E-03
NO ₃	29.19	5.350E-02
SO ₄	0.00	0.000E+00
Silver	0.00	0.000E+00
Aluminum	0.24	4.312E-04
Arsenic	0.00	0.000E+00
Barium	0.00	0.000E+00
Bromine	0.00	2.072E-06
Calcium	0.19	3.566E-04
Cadmium	0.00	0.000E+00
Cerium	0.00	0.000E+00
Chlorine	0.08	1.473E-04
Cobalt	0.00	0.000E+00
Chromium	0.00	9.117E-06
Cesium	0.00	0.000E+00
Copper	0.01	1.119E-05
Iron	0.10	1.749E-04
Indium	0.15	2.693E-04
Potassium	0.10	1.887E-04
Magnesium	0.00	0.000E+00
Manganese	0.00	0.000E+00
Sodium	0.00	0.000E+00
Nickel	0.01	1.119E-05
Phosphorous	0.00	0.000E+00
Lead	0.00	0.000E+00
Rubidium	0.00	0.000E+00
Sulfur	4.16	7.620E-03
Antimony	0.00	0.000E+00
Selenium	0.00	0.000E+00
Silicon	0.07	1.248E-04
Tin	0.00	0.000E+00
Strontium	0.00	0.000E+00
Titanium	0.00	0.000E+00
Vanadium	0.00	0.000E+00
Zinc	0.00	3.107E-06
Zirconium	0.00	0.000E+00

Quartz Sample:	Catch [µg]:	Emission Rate [g/hr]
Elemental Carbon	6.84	1.007E-02
Organic Carbon	44.60	6.562E-02

DRAFT

Appliance:	Waste Oil Burner	Burn Rate:	Single	Run #:	18
Fuel:	Waste Oil	Date:	4/14/2011		

Filter Information:

T1 ID #:	A751824T
T1 Flow Rate [mL/min]:	3754
T1 Sample Volume [dsft ³]:	21.58
Q1 ID #:	A751829Y
Q1 Flow Rate [mL/min]:	3699
Q1 Sample Volume [dsft ³]:	21.27

Run Information:

Test Duration [min]:	163
Tunnel Flow [dsft ³ /min]:	445.7873
Barometric Pressure [in Hg]:	30.14
Temperature [°F]:	72.95
Avg Delta H [in H2O]:	0.4752
Burn Rate [kg/hr]	15.46

Teflon Sample:	Catch [µg]:	Emission Rate [g/hr]
Total PM _{2.5}	8402.00	1.041E+01
K ⁺	337.71	4.185E-01
Na ⁺	564.26	6.993E-01
NH ₄ ⁺	0.00	0.000E+00
NO ₃	556.29	6.894E-01
SO ₄	461.95	5.725E-01
Silver		No Data
Aluminum	6.66	8.250E-03
Arsenic		No Data
Barium		No Data
Bromine	1.83	2.264E-03
Calcium	181.47	2.249E-01
Cadmium		No Data
Cerium		No Data
Chlorine	1791.18	2.220E+00
Cobalt		No Data
Chromium		No Data
Cesium		No Data
Copper		No Data
Iron	43.96	5.449E-02
Indium		No Data
Potassium	370.56	4.592E-01
Magnesium	19.22	2.381E-02
Manganese		No Data
Sodium		No Data
Nickel		No Data
Phosphorous	700.04	8.676E-01
Lead	14.71	1.823E-02
Rubidium	0.00	0.000E+00
Sulfur	187.50	2.324E-01
Antimony		No Data
Selenium		No Data
Silicon	2.39	2.966E-03
Tin		No Data
Strontium		No Data
Titanium		No Data
Vanadium		No Data
Zinc	1349.93	1.673E+00
Zirconium		No Data

Quartz Sample:	Catch [µg]:	Emission Rate [g/hr]
Elemental Carbon	21.47	2.700E-02
Organic Carbon	79.42	9.989E-02

DRAFT

Appliance:	Coal Stove	Burn Rate:	High	Run #:	20
Fuel:	Dry Stoker Coal	Date:	5/6/2011		

Filter Information:

T1 ID #:	A751822R
T1 Flow Rate [mL/min]:	223
T1 Sample Volume [dsft ³]:	1.62
Q1 ID #:	A751828X
Q1 Flow Rate [mL/min]:	849
Q1 Sample Volume [dsft ³]:	6.18

Run Information:

Test Duration [min]:	208
Tunnel Flow [dsft ³ /min]:	460.1363
Barometric Pressure [in Hg]:	30.14
Temperature [°F]:	76.7
Avg Delta H [in H ₂ O]:	0.4528
Burn Rate [kg/hr]:	2.64

Teflon Sample:	Catch [µg]:	Emission Rate [g/hr]
Total PM _{2.5}	1027.00	1.745E+01
K ⁺	0.17	2.867E-03
Na ⁺	0.21	3.545E-03
NH ₄ ⁺	0.82	1.394E-02
NO ₃	0.83	1.418E-02
SO ₄	3.09	5.244E-02
Silver	0.00	0.000E+00
Aluminum	0.09	1.566E-03
Arsenic	0.04	6.724E-04
Barium	0.00	0.000E+00
Bromine	0.10	1.748E-03
Calcium	0.13	2.170E-03
Cadmium	0.00	0.000E+00
Cerium	0.00	0.000E+00
Chlorine	5.76	9.791E-02
Cobalt	0.00	0.000E+00
Chromium	0.01	1.290E-04
Cesium	0.00	0.000E+00
Copper	0.00	6.343E-05
Iron	0.15	2.566E-03
Indium	0.00	0.000E+00
Potassium	0.19	3.264E-03
Magnesium	0.00	0.000E+00
Manganese	0.00	0.000E+00
Sodium	0.00	0.000E+00
Nickel	0.00	0.000E+00
Phosphorous	0.00	0.000E+00
Lead	0.48	8.184E-03
Rubidium	0.00	0.000E+00
Sulfur	8.99	1.527E-01
Antimony	0.40	6.722E-03
Selenium	0.04	5.975E-04
Silicon	0.06	9.742E-04
Tin	0.00	0.000E+00
Strontium	0.00	0.000E+00
Titanium	0.00	0.000E+00
Vanadium	0.00	0.000E+00
Zinc	0.89	1.516E-02
Zirconium	0.00	0.000E+00

Quartz Sample:	Catch [µg]:	Emission Rate [g/hr]
Elemental Carbon	693.05	3.094E+00
Organic Carbon	1620.49	7.234E+00

DRAFT

Appliance:	Coal Stove	Burn Rate:	Low	Run #:	21
Fuel:	Dry Stoker Coal	Date:	5/9/2011		

Filter Information:

T1 ID #:	A751821Q
T1 Flow Rate [mL/min]:	780.81
T1 Sample Volume [dsft ³]:	10.82
Q1 ID #:	A751837Y
Q1 Flow Rate [mL/min]:	893.53
Q1 Sample Volume [dsft ³]:	12.38

Run Information:

Test Duration [min]:	391
Tunnel Flow [dsft ³ /min]:	478.2646
Barometric Pressure [in Hg]:	30.2
Temperature [°F]:	71.46
Avg Delta H [in H ₂ O]:	0.442
Burn Rate [kg/hr]	1.498

Teflon Sample:	Catch [µg]:	Emission Rate [g/hr]
Total PM _{2.5}	655.00	1.737E+00
K ⁺	0.00	0.000E+00
Na ⁺	0.17	4.488E-04
NH ₄ ⁺	2.32	6.163E-03
NO ₃	0.92	2.447E-03
SO ₄	6.48	1.719E-02
Silver	0.00	0.000E+00
Aluminum	0.01	2.846E-05
Arsenic	0.02	4.796E-05
Barium	0.00	0.000E+00
Bromine	0.02	5.336E-05
Calcium	0.01	1.507E-05
Cadmium	0.00	0.000E+00
Cerium	0.00	0.000E+00
Chlorine	0.50	1.320E-03
Cobalt	0.00	1.020E-05
Chromium	0.00	0.000E+00
Cesium	0.00	0.000E+00
Copper	0.04	1.097E-04
Iron	0.06	1.689E-04
Indium	0.01	2.997E-05
Potassium	0.00	0.000E+00
Magnesium	0.00	0.000E+00
Manganese	0.00	0.000E+00
Sodium	0.00	0.000E+00
Nickel	0.00	0.000E+00
Phosphorous	0.00	0.000E+00
Lead	0.04	9.892E-05
Rubidium	0.00	0.000E+00
Sulfur	3.60	9.541E-03
Antimony	0.00	0.000E+00
Selenium	0.01	1.499E-05
Silicon	0.00	0.000E+00
Tin	0.00	0.000E+00
Strontium	0.00	0.000E+00
Titanium	0.00	0.000E+00
Vanadium	0.00	0.000E+00
Zinc	0.06	1.682E-04
Zirconium	0.00	0.000E+00

Quartz Sample:	Catch [µg]:	Emission Rate [g/hr]
Elemental Carbon	267.46	6.199E-01
Organic Carbon	1417.80	3.286E+00

DRAFT

Appliance:	Coal Stove	Burn Rate:	Low	Run #:	23
Fuel:	Wet Stoker Coal	Date:	5/11/2011		

Filter Information:

T1 ID #:	A751820P
T1 Flow Rate [mL/min]:	142.9
T1 Sample Volume [dsft ³]:	1.47
Q1 ID #:	A7518492
Q1 Flow Rate [mL/min]:	896.63
Q1 Sample Volume [dsft ³]:	9.21

Run Information:

Test Duration [min]:	294
Tunnel Flow [dsft ³ /min]:	467.5876
Barometric Pressure [in Hg]:	29.97
Temperature [°F]:	75.0131
Avg Delta H [in H2O]:	0.4214
Burn Rate [kg/hr]:	1.477

Teflon Sample:	Catch [µg]:	Emission Rate [g/hr]
Total PM _{2.5}	582.00	1.113E+01
K ⁺	0.00	0.000E+00
Na ⁺	0.23	4.325E-03
NH ₄ ⁺	0.75	1.431E-02
NO ₃	3.60	6.891E-02
SO ₄	3.06	5.854E-02
Silver	0.00	0.000E+00
Aluminum	0.04	6.797E-04
Arsenic	0.01	2.809E-04
Barium	0.00	0.000E+00
Bromine	0.00	6.481E-06
Calcium	0.07	1.411E-03
Cadmium	0.07	1.296E-03
Cerium	0.00	0.000E+00
Chlorine	0.46	8.799E-03
Cobalt	0.01	1.319E-04
Chromium	0.00	0.000E+00
Cesium	0.08	1.624E-03
Copper	0.00	0.000E+00
Iron	0.10	1.848E-03
Indium	0.08	1.512E-03
Potassium	0.08	1.521E-03
Magnesium	0.00	0.000E+00
Manganese	0.00	0.000E+00
Sodium	0.00	0.000E+00
Nickel	0.01	2.637E-04
Phosphorous	0.00	0.000E+00
Lead	0.01	1.728E-04
Rubidium	0.00	9.505E-05
Sulfur	1.65	3.163E-02
Antimony	0.00	0.000E+00
Selenium	0.00	7.779E-05
Silicon	0.00	0.000E+00
Tin	0.00	0.000E+00
Strontium	0.00	0.000E+00
Titanium	0.02	4.762E-04
Vanadium	0.01	2.164E-04
Zinc	0.07	1.346E-03
Zirconium	0.05	8.641E-04

Quartz Sample:	Catch [µg]:	Emission Rate [g/hr]
Elemental Carbon	167.08	5.090E-01
Organic Carbon	2367.08	7.212E+00

DRAFT

Appliance: Non Qualified OWHH **Burn Rate:** High **Run #:** 25
Fuel: Spruce **Date:** 5/27/2011

Filter Information:

T1 ID #:	A7583519
T1 Flow Rate [mL/min]:	168.8
T1 Sample Volume [dsft ³]:	0.70
Q1 ID #:	A7518470
Q1 Flow Rate [mL/min]:	924.45
Q1 Sample Volume [dsft ³]:	3.86

Run Information:

Test Duration [min]:	118
Tunnel Flow [dsft ³ /min]:	387.2835
Barometric Pressure [in Hg]:	29.99
Temperature [°F]:	68.3866
Avg Delta H [in H2O]:	0.4198
Burn Rate [kg/hr]:	23.8906

Teflon Sample:	Catch [µg]:	Emission Rate [g/hr]
Total PM _{2.5}	3946.00	1.301E+02
K ⁺	64.11	2.113E+00
Na ⁺	0.87	2.868E-02
NH ₄ ⁺	0.00	0.000E+00
NO ₃	2.92	9.614E-02
SO ₄	19.20	6.328E-01
Silver	0.00	0.000E+00
Aluminum	0.00	0.000E+00
Arsenic	0.00	0.000E+00
Barium	0.00	0.000E+00
Bromine	0.07	2.312E-03
Calcium	0.95	3.136E-02
Cadmium	0.00	0.000E+00
Cerium	0.00	0.000E+00
Chlorine	11.62	3.831E-01
Cobalt	0.01	4.868E-04
Chromium	0.01	2.220E-04
Cesium	0.00	0.000E+00
Copper	0.13	4.258E-03
Iron	0.20	6.561E-03
Indium	0.01	3.726E-04
Potassium	72.77	2.399E+00
Magnesium	0.29	9.466E-03
Manganese	0.06	1.956E-03
Sodium	7.71	2.540E-01
Nickel	0.01	4.302E-04
Phosphorous	0.00	0.000E+00
Lead	0.02	5.594E-04
Rubidium	0.05	1.603E-03
Sulfur	8.89	2.931E-01
Antimony	0.00	0.000E+00
Selenium	0.00	0.000E+00
Silicon	0.07	2.343E-03
Tin	0.31	1.006E-02
Strontium	0.01	2.237E-04
Titanium	0.00	0.000E+00
Vanadium	0.00	0.000E+00
Zinc	6.26	2.062E-01
Zirconium	0.00	0.000E+00

Quartz Sample:	Catch [µg]:	Emission Rate [g/hr]
Elemental Carbon	1717.98	1.034E+01
Organic Carbon	7290.90	4.388E+01

DRAFT

Appliance: Non Qualified OWHH **Burn Rate:** Low **Run #:** 26
Fuel: Wet Stoker Coal **Date:** 5/30/2011

Filter Information:

T1 ID #:	A7583508
T1 Flow Rate [mL/min]:	130.9
T1 Sample Volume [dsft ³]:	0.57
Q1 ID #:	A751838Z
Q1 Flow Rate [mL/min]:	1037.6
Q1 Sample Volume [dsft ³]:	4.50

Run Information:

Test Duration [min]:	123
Tunnel Flow [dsft ³ /min]:	424.9401
Barometric Pressure [in Hg]:	29.98
Temperature [°F]:	69.9032
Avg Delta H [in H2O]:	0.4735
Burn Rate [kg/hr]	10.276

Teflon Sample:	Catch [µg]:	Emission Rate [g/hr]
Total PM _{2.5}	6564.00	2.946E+02
K ⁺	4.62	2.074E-01
Na ⁺	0.48	2.146E-02
NH ₄ ⁺	1.03	4.630E-02
NO ₃	0.75	3.363E-02
SO ₄	16.02	7.192E-01
Silver	0.00	0.000E+00
Aluminum	0.32	1.439E-02
Arsenic	0.10	4.523E-03
Barium	0.00	0.000E+00
Bromine	0.17	7.619E-03
Calcium	0.82	3.678E-02
Cadmium	0.06	2.537E-03
Cerium	0.00	0.000E+00
Chlorine	1.53	6.887E-02
Cobalt	0.01	5.771E-04
Chromium	0.01	4.627E-04
Cesium	0.05	2.339E-03
Copper	0.23	1.031E-02
Iron	0.59	2.655E-02
Indium	0.00	0.000E+00
Potassium	6.76	3.036E-01
Magnesium	0.00	0.000E+00
Manganese	0.05	2.297E-03
Sodium	4.67	2.094E-01
Nickel	0.02	8.568E-04
Phosphorous	0.00	0.000E+00
Lead	0.20	9.194E-03
Rubidium	0.03	1.422E-03
Sulfur	21.57	9.678E-01
Antimony	0.00	0.000E+00
Selenium	0.00	1.016E-04
Silicon	0.00	2.126E-04
Tin	0.00	0.000E+00
Strontium	0.03	1.168E-03
Titanium	0.00	0.000E+00
Vanadium	0.00	0.000E+00
Zinc	0.70	3.141E-02
Zirconium	0.00	0.000E+00

Quartz Sample:	Catch [µg]:	Emission Rate [g/hr]
Elemental Carbon		No Data
Organic Carbon		No Data

DRAFT

Appliance: Non-Qualified OWHH **Burn Rate:** Low **Run #:** 27
Fuel: Coal with ClearStak **Date:** 6/1/2011

Filter Information:

T1 ID #:	A758338C
T1 Flow Rate [mL/min]:	178.21
T1 Sample Volume [dsft ³]:	1.24
Q1 ID #:	A751846Z
Q1 Flow Rate [mL/min]:	1017
Q1 Sample Volume [dsft ³]:	7.08

Run Information:

Test Duration [min]:	196
Tunnel Flow [dsft ³ /min]:	426.929
Barometric Pressure [in Hg]:	30.15
Temperature [°F]:	69.7107
Avg Delta H [in H ₂ O]:	0.4826
Burn Rate [kg/hr]	6.449

Teflon Sample:	Catch [µg]:	Emission Rate [g/hr]
Total PM _{2.5}	5815.00	1.201E+02
K ⁺	0.90	1.852E-02
Na ⁺	0.45	9.383E-03
NH ₄ ⁺	0.35	7.138E-03
NO ₃	0.36	7.417E-03
SO ₄	9.88	2.041E-01
Silver	0.00	0.000E+00
Aluminum	0.68	1.399E-02
Arsenic	0.06	1.263E-03
Barium	0.00	0.000E+00
Bromine	0.06	1.239E-03
Calcium	0.20	4.083E-03
Cadmium	0.10	2.102E-03
Cerium	0.00	0.000E+00
Chlorine	0.41	8.453E-03
Cobalt	0.00	6.812E-05
Chromium	0.02	5.009E-04
Cesium	0.00	0.000E+00
Copper	0.05	9.681E-04
Iron	0.27	5.492E-03
Indium	0.00	0.000E+00
Potassium	1.33	2.757E-02
Magnesium	0.00	0.000E+00
Manganese	0.00	0.000E+00
Sodium	1.52	3.131E-02
Nickel	0.01	1.877E-04
Phosphorous	0.00	0.000E+00
Lead	0.30	6.102E-03
Rubidium	0.01	1.168E-04
Sulfur	17.99	3.716E-01
Antimony	0.00	0.000E+00
Selenium	0.01	2.572E-04
Silicon	0.00	0.000E+00
Tin	0.00	0.000E+00
Strontium	0.00	0.000E+00
Titanium	0.00	0.000E+00
Vanadium	0.00	0.000E+00
Zinc	0.43	8.902E-03
Zirconium	0.00	0.000E+00

Quartz Sample:	Catch [µg]:	Emission Rate [g/hr]
Elemental Carbon		No Data
Organic Carbon		No Data

DRAFT

Appliance: Coal HH **Burn Rate:** Single, Cold Start **Run #:** 28
Fuel: Coal (typical moisture) **Date:** 6/7/2011

Filter Information:

T1 ID #:	A758349F
T1 Flow Rate [mL/min]:	183.52
T1 Sample Volume [dsft ³]:	1.30
Q1 ID #:	A751835W
Q1 Flow Rate [mL/min]:	979.11
Q1 Sample Volume [dsft ³]:	6.95

Run Information:

Test Duration [min]:	202
Tunnel Flow [dsft ³ /min]:	427.5965
Barometric Pressure [in Hg]:	30.13
Temperature [°F]:	74.98
Avg Delta H [in H ₂ O]:	0.48
Burn Rate [kg/hr]	16.08

Teflon Sample:	Catch [µg]:	Emission Rate [g/hr]
Total PM _{2.5}	364.00	7.172E+00
K ⁺	14.23	2.804E-01
Na ⁺	15.92	3.137E-01
NH ₄ ⁺	14.04	2.766E-01
NO ₃	1.72	3.382E-02
SO ₄	153.86	3.031E+00
Silver	0.00	0.000E+00
Aluminum	1.47	2.902E-02
Arsenic	0.10	2.049E-03
Barium	0.27	5.251E-03
Bromine	0.01	2.450E-04
Calcium	5.60	1.104E-01
Cadmium	0.00	0.000E+00
Cerium	0.00	0.000E+00
Chlorine	0.14	2.777E-03
Cobalt	0.03	6.219E-04
Chromium	0.19	3.771E-03
Cesium	0.05	9.835E-04
Copper	0.98	1.928E-02
Iron	4.74	9.347E-02
Indium	0.00	0.000E+00
Potassium	13.00	2.561E-01
Magnesium	0.73	1.432E-02
Manganese	0.15	2.895E-03
Sodium	15.55	3.064E-01
Nickel	0.10	1.999E-03
Phosphorous	0.26	5.206E-03
Lead	1.73	3.401E-02
Rubidium	0.07	1.425E-03
Sulfur	47.50	9.358E-01
Antimony	0.00	0.000E+00
Selenium	0.03	6.682E-04
Silicon	1.90	3.735E-02
Tin	0.00	0.000E+00
Strontium	0.06	1.136E-03
Titanium	0.06	1.274E-03
Vanadium	0.00	8.932E-05
Zinc	2.53	4.982E-02
Zirconium	0.03	6.680E-04

Quartz Sample:	Catch [µg]:	Emission Rate [g/hr]
Elemental Carbon	39.95	1.475E-01
Organic Carbon	184.95	6.830E-01

DRAFT

Appliance:	Coal HH	Burn Rate:	Single	Run #:	29
Fuel:	Wet Stoker Coal	Date:	6/7/2011		

Filter Information:

T1 ID #:	A7583406
T1 Flow Rate [mL/min]:	160.56
T1 Sample Volume [dsft ³]:	1.12
Q1 ID #:	A751834V
Q1 Flow Rate [mL/min]:	1029.4
Q1 Sample Volume [dsft ³]:	7.20

Run Information:

Test Duration [min]:	200
Tunnel Flow [dsft ³ /min]:	410.0643
Barometric Pressure [in Hg]:	30.13
Temperature [°F]:	77.6453
Avg Delta H [in H ₂ O]:	0.49
Burn Rate [kg/hr]:	16.24

Teflon Sample:	Catch [µg]:	Emission Rate [g/hr]
Total PM _{2.5}	355.00	7.782E+00
K ⁺	12.99	2.848E-01
Na ⁺	14.90	3.267E-01
NH ₄ ⁺	9.31	2.040E-01
NO ₃	1.91	4.191E-02
SO ₄	141.80	3.108E+00
Silver	0.00	0.000E+00
Aluminum	2.61	5.716E-02
Arsenic	0.23	5.056E-03
Barium	0.42	9.126E-03
Bromine	0.11	2.503E-03
Calcium	10.91	2.391E-01
Cadmium	0.00	0.000E+00
Cerium	0.00	2.485E-05
Chlorine	0.24	5.153E-03
Cobalt	0.05	1.141E-03
Chromium	0.21	4.520E-03
Cesium	0.00	0.000E+00
Copper	1.16	2.542E-02
Iron	7.81	1.712E-01
Indium	0.00	0.000E+00
Potassium	13.59	2.979E-01
Magnesium	1.41	3.085E-02
Manganese	0.18	4.046E-03
Sodium	16.67	3.653E-01
Nickel	0.15	3.232E-03
Phosphorous	0.20	4.436E-03
Lead	1.90	4.166E-02
Rubidium	0.09	1.958E-03
Sulfur	46.51	1.020E+00
Antimony	0.19	4.211E-03
Selenium	0.04	8.426E-04
Silicon	4.77	1.046E-01
Tin	0.00	0.000E+00
Strontium	0.11	2.379E-03
Titanium	0.16	3.407E-03
Vanadium	0.05	9.940E-04
Zinc	2.38	5.209E-02
Zirconium	0.15	3.221E-03

Quartz Sample:	Catch [µg]:	Emission Rate [g/hr]
Elemental Carbon	41.08	1.405E-01
Organic Carbon	187.91	6.425E-01

DRAFT

Appliance: Non Qualified OWHH **Burn Rate:** Low **Run #:** 30
Fuel: Spruce **Date:** 6/30/2011

Filter Information:

T1 ID #:	A7583417
T1 Flow Rate [mL/min]:	200.7
T1 Sample Volume [dsft ³]:	0.79
Q1 ID #:	A751831S
Q1 Flow Rate [mL/min]:	997.4
Q1 Sample Volume [dsft ³]:	3.90

Run Information:

Test Duration [min]:	112
Tunnel Flow [dsft ³ /min]:	412.9687
Barometric Pressure [in Hg]:	30.16
Temperature [°F]:	78.439
Avg Delta H [in H2O]:	0.4357
Burn Rate [kg/hr]	13.5412

Teflon Sample:	Catch [µg]:	Emission Rate [g/hr]
Total PM _{2.5}	5514.00	1.740E+02
K ⁺	27.50	8.678E-01
Na ⁺	1.20	3.783E-02
NH ₄ ⁺	0.25	7.858E-03
NO ₃	1.53	4.827E-02
SO ₄	6.79	2.141E-01
Silver	0.00	0.000E+00
Aluminum	0.00	0.000E+00
Arsenic	0.01	2.858E-04
Barium	0.00	0.000E+00
Bromine	0.08	2.393E-03
Calcium	0.60	1.883E-02
Cadmium	0.00	0.000E+00
Cerium	0.00	0.000E+00
Chlorine	4.34	1.369E-01
Cobalt	0.00	1.543E-04
Chromium	0.00	0.000E+00
Cesium	0.00	0.000E+00
Copper	0.28	8.946E-03
Iron	0.10	3.033E-03
Indium	0.00	0.000E+00
Potassium	36.99	1.167E+00
Magnesium	0.09	2.859E-03
Manganese	0.02	6.768E-04
Sodium	4.64	1.465E-01
Nickel	0.00	1.505E-04
Phosphorous	0.00	0.000E+00
Lead	0.04	1.250E-03
Rubidium	0.02	6.069E-04
Sulfur	3.06	9.652E-02
Antimony	0.02	7.134E-04
Selenium	0.01	2.286E-04
Silicon	0.00	0.000E+00
Tin	0.00	0.000E+00
Strontium	0.00	0.000E+00
Titanium	0.02	6.551E-04
Vanadium	0.00	1.449E-04
Zinc	5.24	1.653E-01
Zirconium	0.00	0.000E+00

Quartz Sample:	Catch [µg]:	Emission Rate [g/hr]
Elemental Carbon		No Data
Organic Carbon		No Data

DRAFT

Appliance: Non Qualified OWHH **Burn Rate:** High **Run #:** 31
Fuel: Birch **Date:** 7/1/2011

Filter Information:

T1 ID #:	A758339D
T1 Flow Rate [mL/min]:	211.3
T1 Sample Volume [dsft ³]:	0.86
Q1 ID #:	A768262E
Q1 Flow Rate [mL/min]:	997.4
Q1 Sample Volume [dsft ³]:	4.04

Run Information:

Test Duration [min]:	115
Tunnel Flow [dsft ³ /min]:	367.8844
Barometric Pressure [in Hg]:	30.21
Temperature [°F]:	74.7845
Avg Delta H [in H2O]:	0.4263
Burn Rate [kg/hr]	20.1291

Teflon Sample:	Catch [µg]:	Emission Rate [g/hr]
Total PM _{2.5}	4628.00	1.193E+02
K ⁺	111.69	2.880E+00
Na ⁺	0.36	9.180E-03
NH ₄ ⁺	0.16	4.000E-03
NO ₃	4.15	1.071E-01
SO ₄	59.52	1.535E+00
Silver	0.15	3.789E-03
Aluminum	0.00	0.000E+00
Arsenic	0.01	3.213E-04
Barium	0.00	0.000E+00
Bromine	0.09	2.335E-03
Calcium	0.47	1.222E-02
Cadmium	0.03	8.745E-04
Cerium	0.00	0.000E+00
Chlorine	18.86	4.864E-01
Cobalt	0.01	3.815E-04
Chromium	0.00	0.000E+00
Cesium	0.00	0.000E+00
Copper	0.09	2.214E-03
Iron	0.05	1.352E-03
Indium	0.00	0.000E+00
Potassium	116.85	3.013E+00
Magnesium	0.60	1.546E-02
Manganese	0.08	2.082E-03
Sodium	25.62	6.606E-01
Nickel	0.00	4.983E-05
Phosphorous	0.00	0.000E+00
Lead	0.02	4.963E-04
Rubidium	0.08	2.043E-03
Sulfur	24.02	6.193E-01
Antimony	0.00	0.000E+00
Selenium	0.00	0.000E+00
Silicon	0.00	0.000E+00
Tin	0.00	0.000E+00
Strontium	0.01	3.501E-04
Titanium	0.00	0.000E+00
Vanadium	0.00	0.000E+00
Zinc	21.39	5.516E-01
Zirconium	0.00	0.000E+00

Quartz Sample:	Catch [µg]:	Emission Rate [g/hr]
Elemental Carbon	1632.88	8.920E+00
Organic Carbon	6724.69	3.674E+01

DRAFT

Appliance:	Non Qualified OWHH	Burn Rate:	Low	Run #:	32
Fuel:	Birch	Date:	7/6/2011		

Filter Information:

T1 ID #:	A7583428
T1 Flow Rate [mL/min]:	159.34
T1 Sample Volume [dsft ³]:	1.26
Q1 ID #:	A768261D
Q1 Flow Rate [mL/min]:	1030.9
Q1 Sample Volume [dsft ³]:	8.18

Run Information:

Test Duration [min]:	231
Tunnel Flow [dsft ³ /min]:	413.0445
Barometric Pressure [in Hg]:	30.16
Temperature [°F]:	87.5733
Avg Delta H [in H2O]:	0.4869
Burn Rate [kg/hr]	10.0882

Teflon Sample:	Catch [µg]:	Emission Rate [g/hr]
Total PM _{2.5}	2269.00	4.447E+01
K ⁺	24.55	4.812E-01
Na ⁺	0.19	3.694E-03
NH ₄ ⁺	0.18	3.604E-03
NO ₃	1.75	3.434E-02
SO ₄	12.39	2.428E-01
Silver	0.00	0.000E+00
Aluminum	0.00	0.000E+00
Arsenic	0.01	1.552E-04
Barium	0.00	0.000E+00
Bromine	0.05	1.020E-03
Calcium	0.12	2.377E-03
Cadmium	0.23	4.430E-03
Cerium	0.00	0.000E+00
Chlorine	9.07	1.779E-01
Cobalt	0.00	0.000E+00
Chromium	0.03	5.012E-04
Cesium	0.00	0.000E+00
Copper	0.01	2.730E-04
Iron	0.09	1.669E-03
Indium	0.00	0.000E+00
Potassium	31.92	6.256E-01
Magnesium	0.14	2.820E-03
Manganese	0.00	0.000E+00
Sodium	5.45	1.068E-01
Nickel	0.00	0.000E+00
Phosphorous	0.00	0.000E+00
Lead	0.00	0.000E+00
Rubidium	0.04	7.535E-04
Sulfur	5.62	1.102E-01
Antimony	0.00	0.000E+00
Selenium	0.01	1.352E-04
Silicon	0.00	0.000E+00
Tin	0.17	3.323E-03
Strontium	0.01	2.216E-04
Titanium	0.00	0.000E+00
Vanadium	0.00	0.000E+00
Zinc	8.34	1.635E-01
Zirconium	0.00	0.000E+00

Quartz Sample:	Catch [µg]:	Emission Rate [g/hr]
Elemental Carbon		No Data
Organic Carbon		No Data

DRAFT

Appliance: Non Qualified OWHH **Burn Rate:** Low **Run #:** 33
Fuel: Birch, Cold Start **Date:** 7/8/2011

Filter Information:

T1 ID #:	A7583439
T1 Flow Rate [mL/min]:	145.4
T1 Sample Volume [dsft ³]:	1.77
Q1 ID #:	A768260C & A768259J
Q1 Flow Rate [mL/min]:	980.6
Q1 Sample Volume [dsft ³]:	11.92

Run Information:

Test Duration [min]:	346
Tunnel Flow [dsft ³ /min]:	407.1146
Barometric Pressure [in Hg]:	30.26
Temperature [°F]:	77.2133
Avg Delta H [in H ₂ O]:	0.4393
Burn Rate [kg/hr]	14.909

Teflon Sample:	Catch [µg]:	Emission Rate [g/hr]
Total PM _{2.5}	2514.00	3.475E+01
K ⁺	54.59	7.546E-01
Na ⁺	0.32	4.455E-03
NH ₄ ⁺	0.24	3.267E-03
NO ₃	2.11	2.914E-02
SO ₄	17.83	2.465E-01
Silver	0.02	3.125E-04
Aluminum	0.00	0.000E+00
Arsenic	0.00	6.257E-05
Barium	0.00	0.000E+00
Bromine	0.10	1.423E-03
Calcium	0.59	8.195E-03
Cadmium	0.07	9.374E-04
Cerium	0.02	2.523E-04
Chlorine	26.11	3.610E-01
Cobalt	0.05	6.336E-04
Chromium	0.27	3.668E-03
Cesium	0.00	0.000E+00
Copper	3.50	4.831E-02
Iron	2.92	4.037E-02
Indium	0.00	0.000E+00
Potassium	62.81	8.681E-01
Magnesium	0.64	8.780E-03
Manganese	0.09	1.265E-03
Sodium	14.91	2.061E-01
Nickel	0.12	1.688E-03
Phosphorous	0.00	0.000E+00
Lead	0.19	2.690E-03
Rubidium	0.04	5.628E-04
Sulfur	7.82	1.081E-01
Antimony	0.52	7.186E-03
Selenium	0.00	6.263E-06
Silicon	0.00	0.000E+00
Tin	0.00	0.000E+00
Strontium	0.01	1.094E-04
Titanium	0.00	0.000E+00
Vanadium	0.00	0.000E+00
Zinc	19.54	2.700E-01
Zirconium	0.00	0.000E+00

Quartz Sample:	Catch [µg]:	Emission Rate [g/hr]
Elemental Carbon	2563.52	5.254E+00
Organic Carbon	8579.16	1.758E+01

DRAFT

Appliance: EPA OWHH w/ ClearStak **Burn Rate:** Low **Run #:** 34
Fuel: Birch **Date:** 7/27/2011

Filter Information:

T1 ID #:	A758346C
T1 Flow Rate [mL/min]:	180.3
T1 Sample Volume [dsft ³]:	3.35
Q1 ID #:	A768275J
Q1 Flow Rate [mL/min]:	1108.1
Q1 Sample Volume [dsft ³]:	20.59

Run Information:

Test Duration [min]:	534
Tunnel Flow [dsft ³ /min]:	502.8851
Barometric Pressure [in Hg]:	30.21
Temperature [°F]:	81.5533
Avg Delta H [in H2O]:	0.4472
Burn Rate [kg/hr]	4.981

Teflon Sample:	Catch [µg]:	Emission Rate [g/hr]
Total PM _{2.5}	3754.00	3.382E+01
K ⁺	32.81	2.955E-01
Na ⁺	0.58	5.252E-03
NH ₄ ⁺	0.14	1.226E-03
NO ₃	4.33	3.902E-02
SO ₄	14.90	1.343E-01
Silver	0.00	0.000E+00
Aluminum	0.00	0.000E+00
Arsenic	0.00	0.000E+00
Barium	0.00	0.000E+00
Bromine	0.09	7.949E-04
Calcium	0.51	4.570E-03
Cadmium	0.12	1.120E-03
Cerium	0.01	1.338E-04
Chlorine	12.69	1.143E-01
Cobalt	0.00	2.454E-05
Chromium	0.01	1.325E-04
Cesium	0.00	0.000E+00
Copper	0.12	1.080E-03
Iron	0.44	3.952E-03
Indium	0.27	2.444E-03
Potassium	35.44	3.192E-01
Magnesium	0.22	1.977E-03
Manganese	0.05	4.265E-04
Sodium	10.04	9.043E-02
Nickel	0.01	5.517E-05
Phosphorous	0.00	0.000E+00
Lead	0.04	3.975E-04
Rubidium	0.02	1.936E-04
Sulfur	5.79	5.212E-02
Antimony	0.00	0.000E+00
Selenium	0.00	0.000E+00
Silicon	0.00	0.000E+00
Tin	0.00	0.000E+00
Strontium	0.00	0.000E+00
Titanium	0.00	0.000E+00
Vanadium	0.00	0.000E+00
Zinc	8.50	7.661E-02
Zirconium	0.00	0.000E+00

Quartz Sample:	Catch [µg]:	Emission Rate [g/hr]
Elemental Carbon	717.01	1.051E+00
Organic Carbon	1736.87	2.546E+00

DRAFT

Appliance:	Coal Stove	Burn Rate:	High	Run #:	35
Fuel:	Wet Stoker Coal	Date:	8/10/2011		

Filter Information:

T1 ID #:	A758345B
T1 Flow Rate [mL/min]:	172.5
T1 Sample Volume [dsft ³]:	1.30
Q1 ID #:	A768267J
Q1 Flow Rate [mL/min]:	998.4
Q1 Sample Volume [dsft ³]:	7.54

Run Information:

Test Duration [min]:	220
Tunnel Flow [dsft ³ /min]:	469.458
Barometric Pressure [in Hg]:	30.08
Temperature [°F]:	86.3213
Avg Delta H [in H ₂ O]:	0.4683
Burn Rate [kg/hr]:	2.317

Teflon Sample:	Catch [µg]:	Emission Rate [g/hr]
Total PM_{2.5}	362.00	7.825E+00
K ⁺	0.19	4.040E-03
Na ⁺	0.17	3.624E-03
NH ₄ ⁺	0.45	9.657E-03
NO ₃	0.53	1.154E-02
SO ₄	3.18	6.880E-02
Silver	0.00	0.000E+00
Aluminum	0.00	0.000E+00
Arsenic	0.00	2.442E-05
Barium	0.00	0.000E+00
Bromine	0.02	5.008E-04
Calcium	0.06	1.323E-03
Cadmium	0.00	0.000E+00
Cerium	0.00	0.000E+00
Chlorine	0.11	2.361E-03
Cobalt	0.00	2.442E-05
Chromium	0.00	0.000E+00
Cesium	0.00	0.000E+00
Copper	0.00	0.000E+00
Iron	0.04	8.699E-04
Indium	0.00	0.000E+00
Potassium	0.06	1.398E-03
Magnesium	0.00	0.000E+00
Manganese	0.00	0.000E+00
Sodium	0.00	0.000E+00
Nickel	0.00	5.376E-05
Phosphorous	0.00	0.000E+00
Lead	0.13	2.834E-03
Rubidium	0.00	0.000E+00
Sulfur	1.79	3.875E-02
Antimony	0.45	9.770E-03
Selenium	0.00	6.106E-05
Silicon	0.00	0.000E+00
Tin	0.00	0.000E+00
Strontium	0.02	3.908E-04
Titanium	0.01	2.690E-04
Vanadium	0.00	0.000E+00
Zinc	0.12	2.555E-03
Zirconium	0.00	0.000E+00

Quartz Sample:	Catch [µg]:	Emission Rate [g/hr]
Elemental Carbon	513.67	1.918E+00
Organic Carbon	987.70	3.689E+00

DRAFT

Appliance:	Coal Stove	Burn Rate:	Low, Cold Start	Run #:	36
Fuel:	Wet Lump Coal	Date:	8/11/2011		

Filter Information:

T1 ID #:	A779727Z
T1 Flow Rate [mL/min]:	162.85
T1 Sample Volume [dsft ³]:	2.82
Q1 ID #:	A768258I
Q1 Flow Rate [mL/min]:	1064.4
Q1 Sample Volume [dsft ³]:	18.46

Run Information:

Test Duration [min]:	497
Tunnel Flow [dsft ³ /min]:	488.8577
Barometric Pressure [in Hg]:	30.14
Temperature [°F]:	78.739
Avg Delta H [in H ₂ O]:	0.4488
Burn Rate [kg/hr]:	2.227

Teflon Sample:	Catch [µg]:	Emission Rate [g/hr]
Total PM _{2.5}	1571.00	1.632E+01
K ⁺	0.97	1.012E-02
Na ⁺	0.16	1.675E-03
NH ₄ ⁺	1.31	1.361E-02
NO ₃	1.21	1.257E-02
SO ₄	9.21	9.565E-02
Silver	0.00	0.000E+00
Aluminum	0.07	7.065E-04
Arsenic	0.06	5.754E-04
Barium	0.00	0.000E+00
Bromine	0.06	5.754E-04
Calcium	0.84	8.775E-03
Cadmium	0.00	0.000E+00
Cerium	0.00	0.000E+00
Chlorine	0.82	8.556E-03
Cobalt	0.00	1.059E-05
Chromium	0.02	2.273E-04
Cesium	0.00	0.000E+00
Copper	0.00	0.000E+00
Iron	0.15	1.538E-03
Indium	0.11	1.174E-03
Potassium	1.47	1.524E-02
Magnesium	0.02	1.899E-04
Manganese	0.08	8.520E-04
Sodium	0.00	0.000E+00
Nickel	0.01	5.994E-05
Phosphorous	0.00	0.000E+00
Lead	0.10	1.045E-03
Rubidium	0.01	5.400E-05
Sulfur	7.71	8.004E-02
Antimony	0.00	0.000E+00
Selenium	0.01	1.186E-04
Silicon	0.03	2.808E-04
Tin	0.00	0.000E+00
Strontium	0.00	0.000E+00
Titanium	0.01	1.298E-04
Vanadium	0.00	0.000E+00
Zinc	0.59	6.109E-03
Zirconium	0.00	0.000E+00

Quartz Sample:	Catch [µg]:	Emission Rate [g/hr]
Elemental Carbon		No Data
Organic Carbon		No Data

DRAFT

Appliance:	Coal Stove	Burn Rate:	Low	Run #:	37
Fuel:	Wet Lump Coal	Date:	8/12/2011		

Filter Information:

T1 ID #:	A779726Y
T1 Flow Rate [mL/min]:	247.3
T1 Sample Volume [dsft ³]:	3.37
Q1 ID #:	A768266I
Q1 Flow Rate [mL/min]:	1002.9
Q1 Sample Volume [dsft ³]:	13.67

Run Information:

Test Duration [min]:	393
Tunnel Flow [dsft ³ /min]:	488.5701
Barometric Pressure [in Hg]:	30.12
Temperature [°F]:	81.5964
Avg Delta H [in H ₂ O]:	0.4678
Burn Rate [kg/hr]:	1.3805

Teflon Sample:	Catch [µg]:	Emission Rate [g/hr]
Total PM _{2.5}	316.00	2.748E+00
K ⁺	0.60	5.223E-03
Na ⁺	0.93	8.102E-03
NH ₄ ⁺	0.73	6.348E-03
NO ₃	0.59	5.092E-03
SO ₄	3.83	3.328E-02
Silver	0.00	0.000E+00
Aluminum	0.29	2.552E-03
Arsenic	0.02	1.769E-04
Barium	0.00	0.000E+00
Bromine	0.02	1.327E-04
Calcium	0.25	2.217E-03
Cadmium	0.00	0.000E+00
Cerium	0.00	0.000E+00
Chlorine	0.04	3.262E-04
Cobalt	0.00	0.000E+00
Chromium	0.00	0.000E+00
Cesium	0.00	0.000E+00
Copper	0.02	1.327E-04
Iron	0.13	1.158E-03
Indium	0.08	6.879E-04
Potassium	0.02	2.071E-04
Magnesium	0.00	0.000E+00
Manganese	0.00	0.000E+00
Sodium	0.00	0.000E+00
Nickel	0.01	1.140E-04
Phosphorous	0.00	0.000E+00
Lead	0.01	9.828E-05
Rubidium	0.00	3.832E-05
Sulfur	1.74	1.511E-02
Antimony	0.00	0.000E+00
Selenium	0.00	0.000E+00
Silicon	0.00	0.000E+00
Tin	0.00	0.000E+00
Strontium	0.00	0.000E+00
Titanium	0.00	0.000E+00
Vanadium	0.00	0.000E+00
Zinc	0.05	4.158E-04
Zirconium	0.00	0.000E+00

Quartz Sample:	Catch [µg]:	Emission Rate [g/hr]
Elemental Carbon	203.26	4.359E-01
Organic Carbon	1041.70	2.234E+00

DRAFT

Appliance:	Coal Stove	Burn Rate:	Low	Run #:	38
Fuel:	Dry Lump Coal	Date:	8/15/2011		

Filter Information:

T1 ID #:	A7797280
T1 Flow Rate [mL/min]:	170.9
T1 Sample Volume [dsft ³]:	2.18
Q1 ID #:	A768265H
Q1 Flow Rate [mL/min]:	990.81
Q1 Sample Volume [dsft ³]:	12.66

Run Information:

Test Duration [min]:	369
Tunnel Flow [dsft ³ /min]:	515.7899
Barometric Pressure [in Hg]:	30.14
Temperature [°F]:	82.773
Avg Delta H [in H ₂ O]:	0.4588
Burn Rate [kg/hr]:	1.5495

Teflon Sample:	Catch [µg]:	Emission Rate [g/hr]
Total PM _{2.5}	578.00	8.191E+00
K ⁺	0.21	2.943E-03
Na ⁺	0.16	2.301E-03
NH ₄ ⁺	1.04	1.477E-02
NO ₃	0.93	1.311E-02
SO ₄	4.60	6.514E-02
Silver	0.00	0.000E+00
Aluminum	0.16	2.334E-03
Arsenic	0.00	0.000E+00
Barium	0.00	0.000E+00
Bromine	0.02	2.530E-04
Calcium	0.09	1.255E-03
Cadmium	0.00	0.000E+00
Cerium	0.00	0.000E+00
Chlorine	0.19	2.703E-03
Cobalt	0.00	1.443E-05
Chromium	0.01	8.336E-05
Cesium	0.00	0.000E+00
Copper	0.00	4.325E-05
Iron	0.05	7.195E-04
Indium	0.00	0.000E+00
Potassium	0.12	1.691E-03
Magnesium	0.00	0.000E+00
Manganese	0.00	0.000E+00
Sodium	0.00	0.000E+00
Nickel	0.00	0.000E+00
Phosphorous	0.00	0.000E+00
Lead	0.06	8.328E-04
Rubidium	0.00	1.601E-05
Sulfur	2.47	3.495E-02
Antimony	0.00	0.000E+00
Selenium	0.00	0.000E+00
Silicon	0.08	1.173E-03
Tin	0.00	0.000E+00
Strontium	0.00	0.000E+00
Titanium	0.00	1.604E-05
Vanadium	0.00	4.812E-05
Zinc	0.09	1.230E-03
Zirconium	0.00	0.000E+00

Quartz Sample:	Catch [µg]:	Emission Rate [g/hr]
Elemental Carbon	69.56	1.700E-01
Organic Carbon	2238.03	5.470E+00

DRAFT

Appliance:	Coal Stove	Burn Rate:	Low, Cold Start	Run #:	39
Fuel:	Wet Stoker Coal	Date:	8/16/2011		

Filter Information:

T1 ID #:	A779725X
T1 Flow Rate [mL/min]:	198.37
T1 Sample Volume [dsft ³]:	3.09
Q1 ID #:	A768264G & A768263F
Q1 Flow Rate [mL/min]:	1583.7
Q1 Sample Volume [dsft ³]:	24.67

Run Information:

Test Duration [min]:	448
Tunnel Flow [dsft ³ /min]:	522.0773
Barometric Pressure [in Hg]:	30.15
Temperature [°F]:	80.853
Avg Delta H [in H ₂ O]:	0.4557
Burn Rate [kg/hr]:	2.2753

Teflon Sample:	Catch [µg]:	Emission Rate [g/hr]
Total PM _{2.5}	1429.00	1.449E+01
K ⁺	0.94	9.488E-03
Na ⁺	0.15	1.508E-03
NH ₄ ⁺	4.30	4.358E-02
NO ₃	1.15	1.163E-02
SO ₄	15.87	1.609E-01
Silver	0.00	0.000E+00
Aluminum	0.40	4.040E-03
Arsenic	0.02	1.949E-04
Barium	0.00	0.000E+00
Bromine	0.05	5.387E-04
Calcium	0.20	1.983E-03
Cadmium	0.00	0.000E+00
Cerium	0.00	0.000E+00
Chlorine	0.77	7.769E-03
Cobalt	0.04	4.441E-04
Chromium	0.00	0.000E+00
Cesium	0.00	0.000E+00
Copper	0.00	0.000E+00
Iron	0.14	1.382E-03
Indium	0.00	0.000E+00
Potassium	2.18	2.206E-02
Magnesium	0.00	0.000E+00
Manganese	0.00	0.000E+00
Sodium	0.03	3.432E-04
Nickel	0.00	0.000E+00
Phosphorous	0.00	0.000E+00
Lead	0.06	6.189E-04
Rubidium	0.00	1.146E-05
Sulfur	11.58	1.174E-01
Antimony	0.00	0.000E+00
Selenium	0.02	2.017E-04
Silicon	0.00	0.000E+00
Tin	0.00	0.000E+00
Strontium	0.02	1.834E-04
Titanium	0.00	0.000E+00
Vanadium	0.01	1.495E-04
Zinc	0.60	6.043E-03
Zirconium	0.00	0.000E+00

Quartz Sample:	Catch [µg]:	Emission Rate [g/hr]
Elemental Carbon	1951.90	2.479E+00
Organic Carbon	6351.17	8.066E+00

DRAFT

Appliance:	Oil Burner	Burn Rate:	Single	Run #:	40
Fuel:	No 1 Fuel Oil	Date:	8/7/2011		

Filter Information:

T1 ID #:	A779724W
T1 Flow Rate [mL/min]:	195.29
T1 Sample Volume [dsft ³]:	6.01
Q1 ID #:	A768268K
Q1 Flow Rate [mL/min]:	1020.9
Q1 Sample Volume [dsft ³]:	31.42

Run Information:

Test Duration [min]:	885
Tunnel Flow [dsft ³ /min]:	518.3042
Barometric Pressure [in Hg]:	30.18
Temperature [°F]:	81.12
Avg Delta H [in H2O]:	0.4344
Burn Rate [kg/hr]	1.898

Teflon Sample:	Catch [µg]:	Emission Rate [g/hr]
Total PM _{2.5}	60.00	3.104E-01
K ⁺	0.16	8.367E-04
Na ⁺	0.16	8.286E-04
NH ₄ ⁺	4.22	2.183E-02
NO ₃	0.73	3.769E-03
SO ₄	11.48	5.941E-02
Silver	0.00	0.000E+00
Aluminum	0.21	1.110E-03
Arsenic	0.00	0.000E+00
Barium	0.00	0.000E+00
Bromine	0.00	2.514E-05
Calcium	0.29	1.480E-03
Cadmium	0.00	0.000E+00
Cerium	0.00	0.000E+00
Chlorine	0.01	6.440E-05
Cobalt	0.01	4.210E-05
Chromium	0.00	1.988E-05
Cesium	0.00	0.000E+00
Copper	0.03	1.368E-04
Iron	0.12	6.268E-04
Indium	0.14	7.015E-04
Potassium	0.05	2.633E-04
Magnesium	0.00	0.000E+00
Manganese	0.01	3.508E-05
Sodium	0.00	0.000E+00
Nickel	0.00	7.015E-06
Phosphorous	0.00	0.000E+00
Lead	0.00	0.000E+00
Rubidium	0.00	1.052E-05
Sulfur	3.92	2.026E-02
Antimony	0.03	1.754E-04
Selenium	0.00	0.000E+00
Silicon	0.06	3.343E-04
Tin	0.00	0.000E+00
Strontium	0.01	5.846E-05
Titanium	0.01	5.848E-05
Vanadium	0.00	0.000E+00
Zinc	0.01	3.566E-05
Zirconium	0.00	0.000E+00

Quartz Sample:	Catch [µg]:	Emission Rate [g/hr]
Elemental Carbon	6.51	6.440E-03
Organic Carbon	157.78	1.561E-01

DRAFT

Appliance:	EPA Stove	Burn Rate:	Low, Cold Start	Run #:	41
Fuel:	Birch	Date:	8/18/2011		

Filter Information:

T1 ID #:	A779721T
T1 Flow Rate [mL/min]:	202.47
T1 Sample Volume [dsft ³]:	2.04
Q1 ID #:	A768269L
Q1 Flow Rate [mL/min]:	1022.3
Q1 Sample Volume [dsft ³]:	10.32

Run Information:

Test Duration [min]:	288
Tunnel Flow [dsft ³ /min]:	477.4781
Barometric Pressure [in Hg]:	30.145
Temperature [°F]:	76.5744
Avg Delta H [in H2O]:	0.448
Burn Rate [kg/hr]	3.1352

Teflon Sample:	Catch [µg]:	Emission Rate [g/hr]
Total PM_{2.5}	489.00	6.857E+00
K ⁺	2.80	3.925E-02
Na ⁺	0.19	2.603E-03
NH ₄ ⁺	1.44	2.015E-02
NO ₃	1.70	2.385E-02
SO ₄	6.96	9.757E-02
Silver	0.00	0.000E+00
Aluminum	0.00	0.000E+00
Arsenic	0.01	1.791E-04
Barium	0.00	0.000E+00
Bromine	0.03	4.231E-04
Calcium	0.37	5.189E-03
Cadmium	0.00	0.000E+00
Cerium	0.00	0.000E+00
Chlorine	1.81	2.532E-02
Cobalt	0.07	9.133E-04
Chromium	0.01	9.994E-05
Cesium	0.00	0.000E+00
Copper	0.04	5.644E-04
Iron	0.12	1.633E-03
Indium	0.00	0.000E+00
Potassium	3.51	4.926E-02
Magnesium	0.00	0.000E+00
Manganese	0.00	1.903E-05
Sodium	0.00	0.000E+00
Nickel	0.00	3.646E-05
Phosphorous	0.00	0.000E+00
Lead	0.00	0.000E+00
Rubidium	0.00	0.000E+00
Sulfur	3.52	4.939E-02
Antimony	0.00	0.000E+00
Selenium	0.01	9.668E-05
Silicon	0.05	7.648E-04
Tin	0.00	0.000E+00
Strontium	0.01	1.585E-04
Titanium	0.00	0.000E+00
Vanadium	0.00	0.000E+00
Zinc	0.91	1.282E-02
Zirconium	0.05	6.339E-04

Quartz Sample:		Emission Rate [g/hr]
Elemental Carbon	111.51	3.097E-01
Organic Carbon	1016.51	2.823E+00

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