EPA Community Scale Monitoring Project:

Evaluation of Wood Smoke Contribution to Particle Matter in CT

and

Outdoor Wood Furnace Stack Sampling

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Project Background:

EPA grant funding from Round 2 Air Toxics RFA;

Project Narrative at: <u>http://www.epa.gov/ttn/amtic/toxfy05.html</u>

\$500k: CT-DEP lead; NESCAUM subcontractor for OWB testing and ambient monitoring support Project Period: Summer 2006 to Summer 2008

Two Major Project Goals:

- Assess wood smoke contribution to ambient PM2.5 in CT (all sources of WS, not just OWB)
- Characterize in-use residential OWB emission rates for PM2.5 (some other pollutants also measured)

Goal One -- Ambient WS Component:

Use techniques developed in 2004 Rutland VT pilot WS study to semi-quantitatively assess WS-related ambient PM2.5 in real-time.

Details in Rutland Study AWMA conference paper at: <u>http://tinyurl.com/gqct6</u>

A quick summary:

Ambient WS method: Combination of

- 2 channel (2-wavelength) Aethalometer
- continuous PM2.5 measurements

==> Difference between 2 Aethalometer channels: qualitative "fresh" WS indicator (not diesel!)

Use these methods and scaling factors derived from models at a "core" site to determine highly time-resolved ambient WS PM contribution.

Connecticut Emission Inventory PM 2.5 - 21,063 Tons/Year



Absolute and Percent Source Contributions to Hourly PM_{2.5} Mass, by hour of day Rutland, VT



Wood Smoke Monitoring Network in CT Start Date: September 1, 2006



Methodologies for Core and Satellite sites

	Core site	Satellite sites				
	Thomaston	Cornwall	Danbury	East Hartford	New Haven	Mansfield
Specific Wood Smoke Indicator Measurements						
Two-wavelength Aethalometer	Х	Х	X	Х	Х	Х
PM _{2.5} Mass Measurements						
FDMS TEOM	Х			Х	Х	
MetOne BAM		Х	Х		Х	
PM _{2.5} FRM	1/3	1/3	1/3	1/1	1/1	
PM _{2.5} Speciation Measurements						
Sunset OCEC	Х	Х			*	
Continuous SO ₄	Х	Х			*	
3-slot DRUM	Х					
IMPROVE		Х				
STN					Х	
Trace-Gas Measurements						
Trace CO	Х	*			*	
Trace SO ₂	Х	Х			*	
Trace NO _y						
Criteria Gas (non-Trace) Measurements						
СО				X		
SO ₂			Х		Х	
NO _x	X			X	Х	
Ozone		Х	Х	X	Х	
Particle-bound PAHs						
EcoChem PAH	Х					
Meteorological Parameters						
Climatronics	X	Х	Х	Х	Х	X
Data Acquisition						
Data Acquisition	DRDAS	ESC	ESC	ESC	ESC	ESC

BC and DeltaC hourly averages (Output from "old" masher and "new" masher) Thomaston, CT (11/29/06 to 12/11/06)





Next Steps -- Ambient WS Component:

Study started 9/1/06; will run through winter of 07-08; initial analysis will be performed on 1-year period 9/1/06 through 9//1/07.

Settle on final version of Aeth DataMasher that corrects for saturation effects.

• Process all data at all sites

Complete validation of other parameters at core site (SO4, OCEC)

Process DRUM metal data; operated for 1+ year period; will run through this winter; most, but not all filters will be analyzed.

Perform UNMIX source apportionment modeling at core site (Thomaston) as well as other sites w/ necessary parameters (New Haven, Mohawk Mountain; perhaps Springfield, MA and re-run Rutland with newly mashed Aeth data).

• Compare scaling factors across all sites; apply to determine highly time-resolved ambient WS PM contributions.