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**RAISED BILL No. S.B. 126 AN ACT ADDING WOOD SMOKE TO THE PUBLIC HEALTH NUISANCE CODE AND CONCERNING OUTDOOR WOOD-BURNING FURNACES.**

Thank you Senator Ed Meyers, Representative Richard Roy and members of the Environment Committee

My name is Celia Lewis. I am a research consultant for Environment and Human Health, Inc. (EHHI), hired to participate in a study of the inside air of some of the Connecticut homes impacted by neighbor's outdoor wood furnaces (OWFs).

Based on our study's preliminary results, we recommend that outdoor wood furnaces be banned in the state of Connecticut.

Outdoor wood furnaces are very different from either indoor wood stoves or fireplaces inside of homes.

Outdoor wood furnaces are essentially small, insulated sheds with smokestacks. These wood burning sheds sit outside the homes for which they provide heat. They burn wood to heat water that is sent through underground pipes to heat the home.

OWFs have inherent flaws in their design that make them unsafe for those who live near them. They produce large amounts of dense smoke that is capable of entering neighboring homes. OWFs can burn 24 hours a day, seven days a week.

In our study we measured the particulate matter inside four impacted homes and compared that data to the study's control group, seven homes not near OWF's.

The Environmental Protection Agency (EPA) reports that small particles, less than 10 micrometers in diameter, pose a threat to human health because when inhaled they can travel deep into the lungs, and even into the bloodstream. Exposure to these particles affects both lungs and heart. The particles of greatest concern include 2.5 micrometers and smaller.

It is these 2.5 and smaller particles that EHHI studied in these houses.

Our results show that compared to the seven control houses, as well as the EPA regional Air Quality Index, the four impacted homes had

much higher averages of particulate matter, and even higher spikes over the three-day monitoring period.

This means that impacted families experience chronic poor air quality in their homes AND endure periods of dangerously unhealthy air on a DAILY basis.

I refer now to two of the homes we monitored in northeastern CT. (see attached graphs). Each graph shows two things:

- 1) The background levels of PM found in homes **not** near OWF's.
- 2) The levels of PM found in an **impacted home** monitored over three days.

For each home, we monitored both 2.5 and .5 size particles.

You can see that the first impacted home (House C, Windham County) has elevated levels of PM that occasionally fall to normal air quality. In fact, this graph shows that in this home the greatest amount of particulate matter seeps inside in the evenings, builds-up and spikes while the family sleeps. This pattern is associated with an OWF being fired up in the evening about the same time each day.

These conditions would be unhealthy for anyone, but they are especially dangerous for family members who might have pre-existing conditions, such as asthma, COPD, or heart conditions.

The highlighted line represents what our scientists tell us is the level at which health effects begin to manifest. As you can see, this family is breathing unhealthy amounts of particulate matter. The effects of chronic exposure can be cumulative, leading to poor health outcomes over time, such as bronchitis, pneumonia, sinusitis and asthma. The high spikes that we found are cause for concern because they can trigger acute problems such as asthma attacks and myocardial infarctions that result in trips to a physician's office or emergency room.

In the second home (House D, Northeastern Windham County), we found high levels of 2.5 particles on the first day. The second and third day, the levels dropped to normal for the most part. Yet the smaller particles, .5 microns, were elevated on all three days. According to EHHI's toxicologist, these smaller particulates may be of greater concern than the larger ones, because harmful gases attach to these particles more readily as they flow through the air, and then potentially enter homes, and enter people's lungs. These fine particles also stay suspended in air for a longer period of time.

The variability we found in levels of particulate matter in these homes during the course of a day are related to the operation cycles of the

OWF's and also to weather patterns, most specifically wind speed and direction. If there is no wind, the smoke stays in the vicinity for much longer.

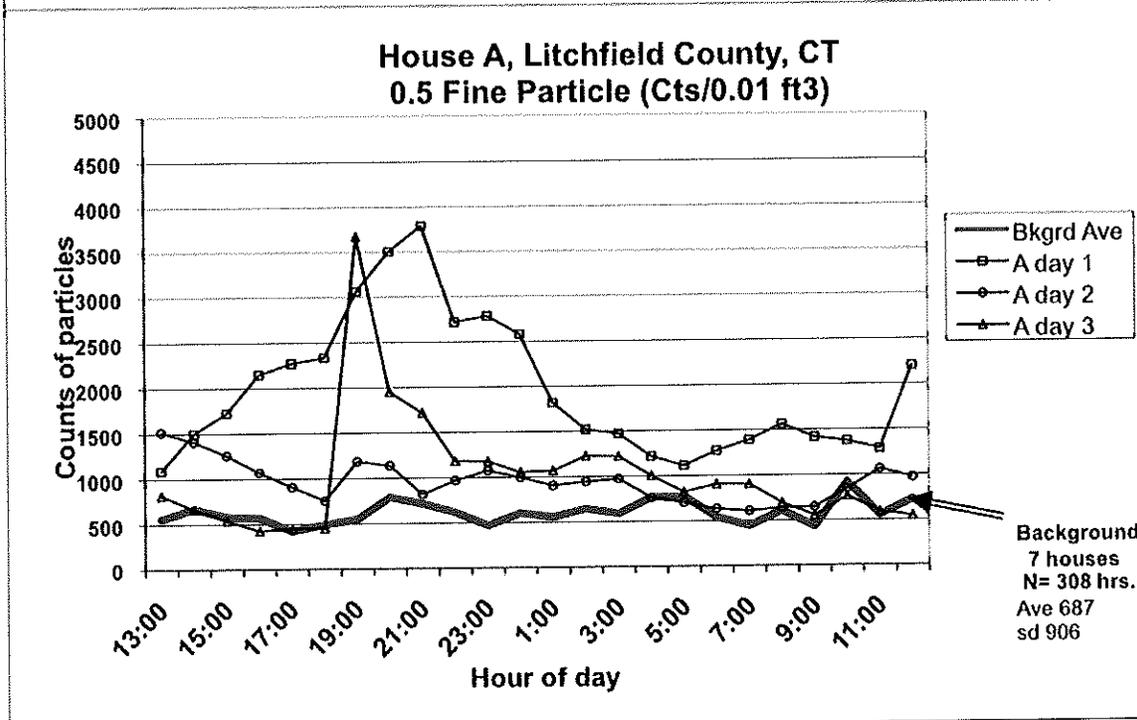
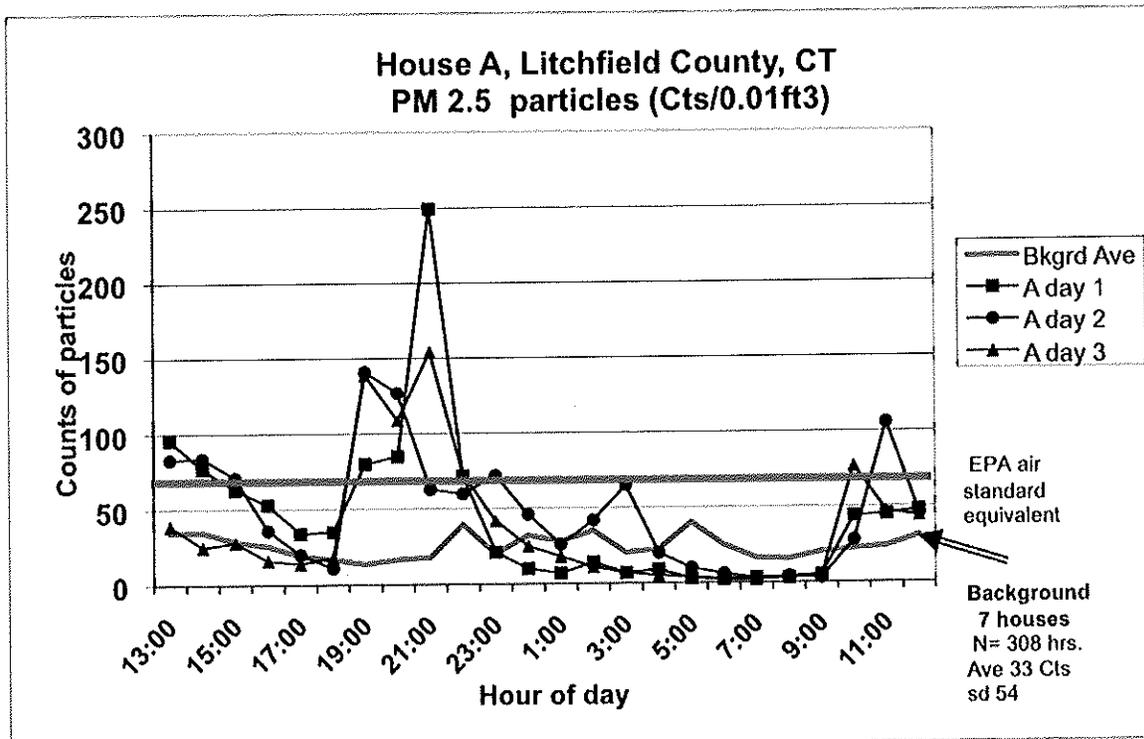
Wood smoke contains known carcinogens – benzene and formaldehyde, along with other toxins. Particles from wood smoke are particularly dangerous because when inhaled, they carry carcinogens and other toxins into the lungs and potentially into the blood stream, increasing the risks of lung disease and cardiopulmonary disease.

Carbon monoxide is also a byproduct of wood smoke. It is undetectable by sight or smell. While we did not measure CO, our data indicates that low levels of carbon monoxide are also likely present in homes near OWF's.

Because of the harmful impacts of these outdoor wood furnaces, the state of Washington has banned them. Nine towns in Connecticut have also banned them. These towns are: Granby, Tolland, Hebron, Woodbridge, South Windsor, Portland, Ridgefield, Norfolk and Haddam.

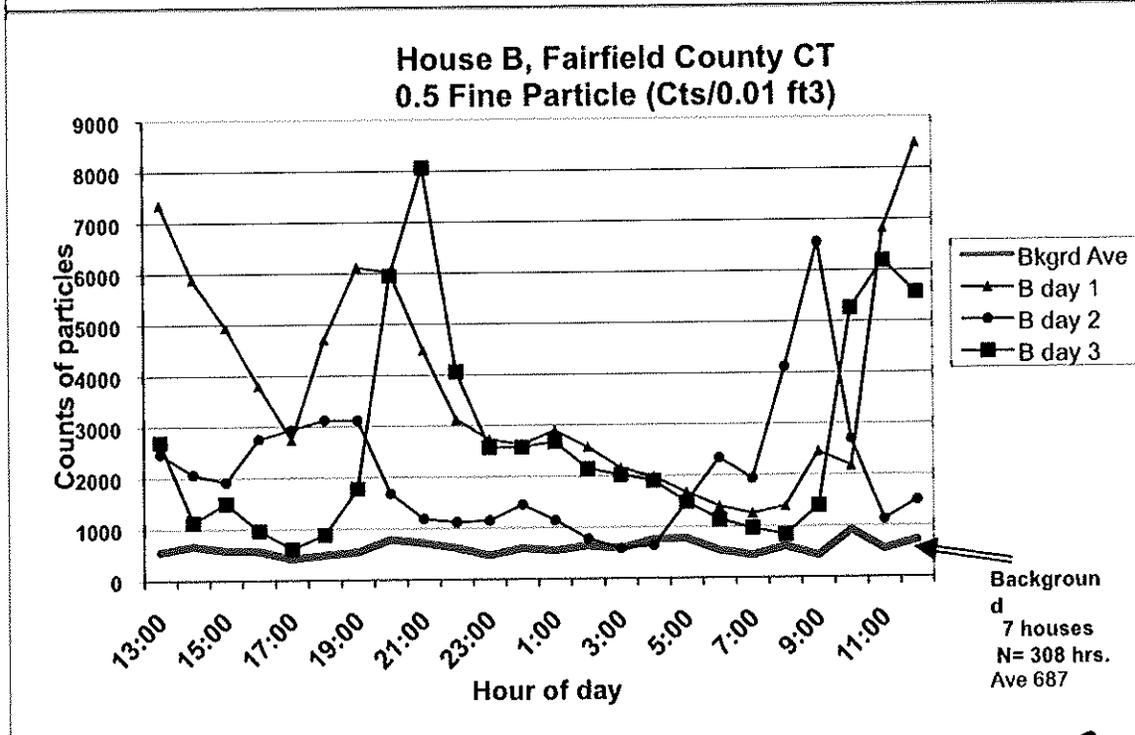
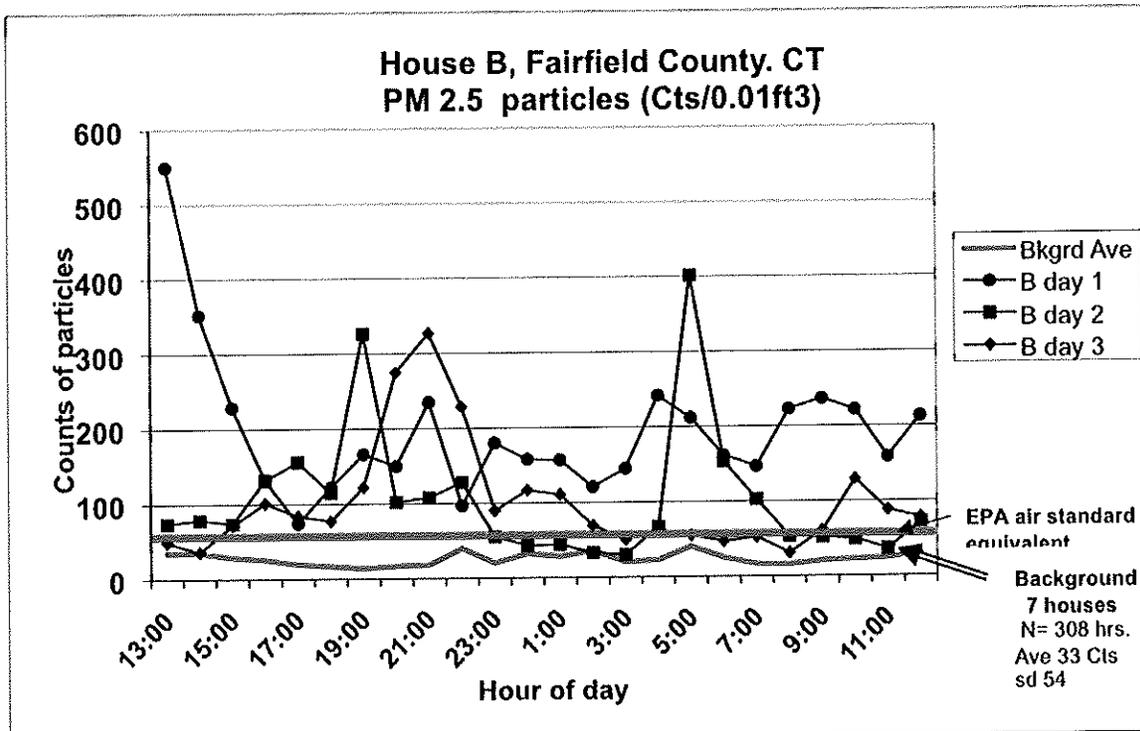
Our study certainly corroborates what the affected families have been complaining about over the past weeks, months and years. They are breathing in harmful particulates and their health is affected. The State of Connecticut needs to ban these outdoor wood-burning appliances before more people in our state are made sick.

Thank you,  
Celia Lewis, M.S., Ph.D., Scientific Consultant  
Environment and Human Health, Inc.



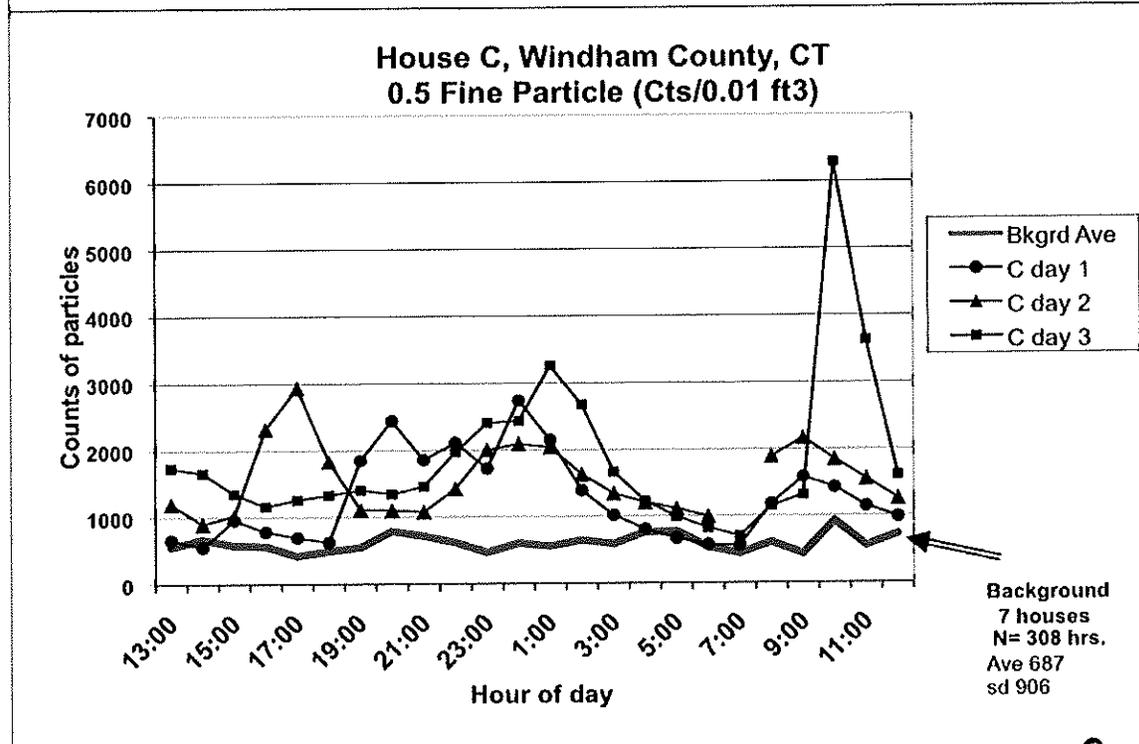
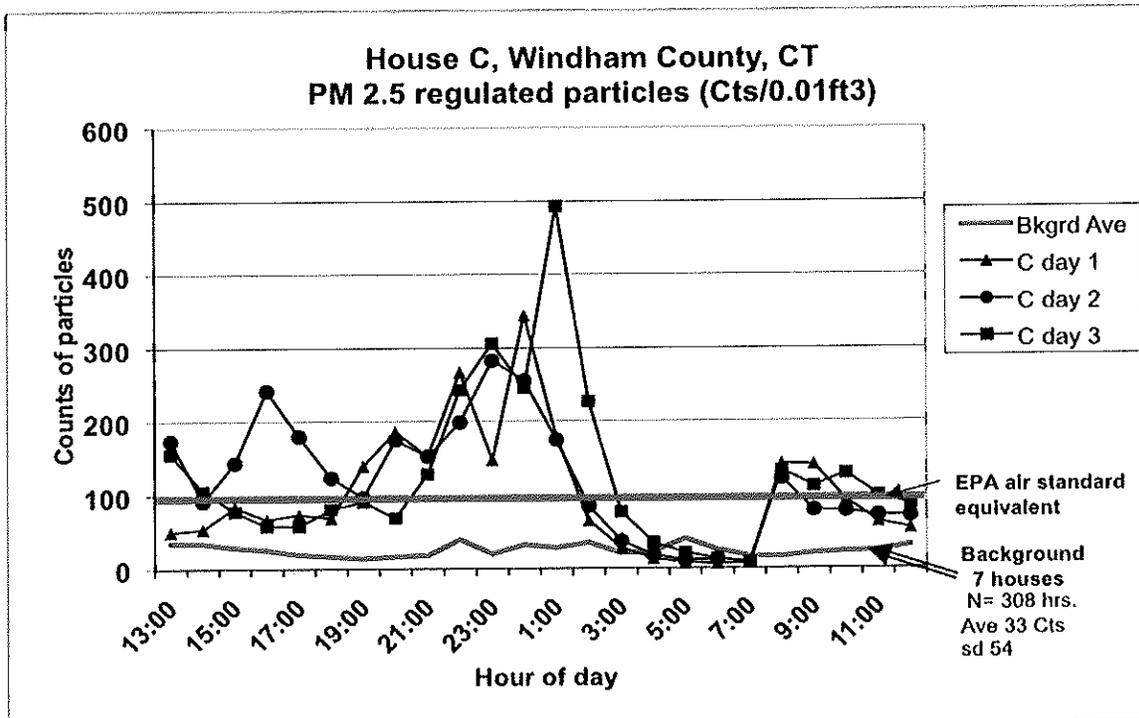
The charts above show hourly measurements over three consecutive days at House A (subjected to OWF smoke) as well as the average hourly measurements in houses *not* near OWFs. The straight horizontal line on the PM 2.5 chart (top) is equivalent to the EPA's ambient air quality standard. Levels of PM 2.5 that exceed the EPA standard are associated with asthma or COPD attacks and hospitalizations, and are also associated with increased risk of cardiac attacks.

**These charts show dangerously high levels of smoke particulates inside the OWF impacted house at all hours of the day, especially at night, compared to normal houses.**



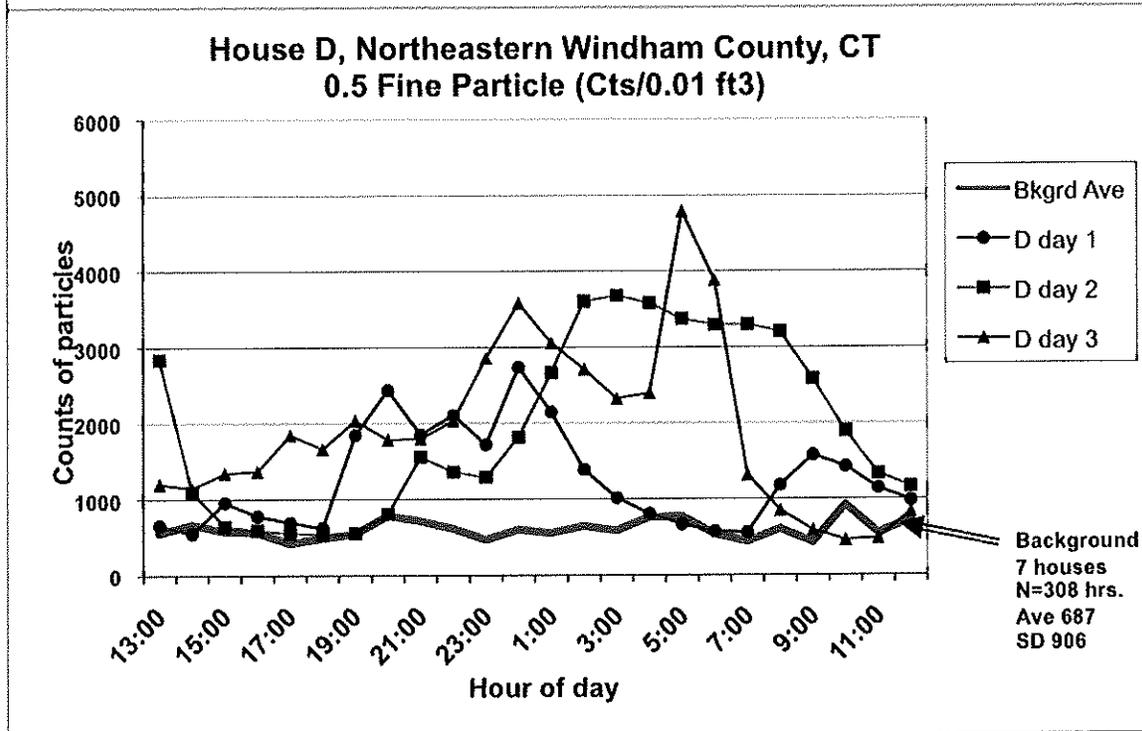
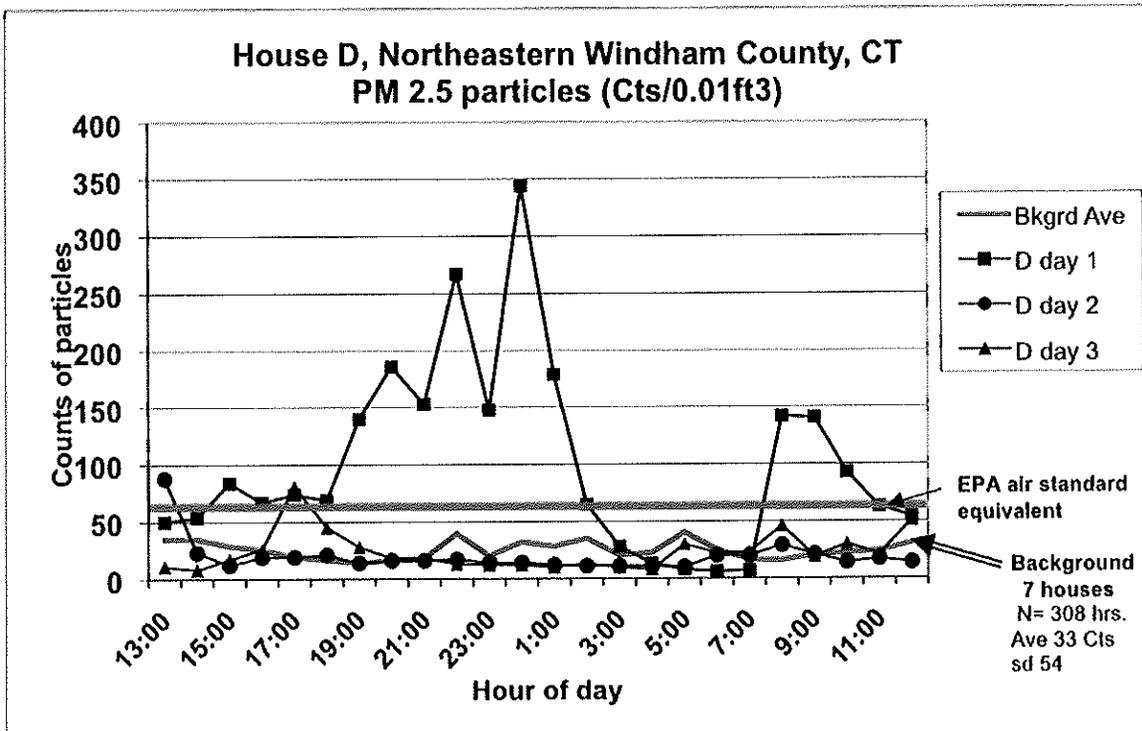
The charts above show hourly measurements over three consecutive days at House B (subjected to OWF smoke) as well as the average hourly measurements in houses *not* near OWFs. The straight horizontal line on the PM 2.5 chart (top) is equivalent to the EPA's ambient air quality standard. Levels of PM 2.5 that exceed the EPA standard are associated with asthma or COPD attacks and hospitalizations, and are also associated with increased risk of cardiac attacks.

**These charts show dangerously high levels of smoke particulates inside the OWF impacted house at all hours of the day, especially at night, compared to normal houses.**



The charts above show hourly measurements over three consecutive days at House C (subjected to OWF smoke) as well as the average hourly measurements in houses *not* near OWFs. The straight horizontal line on the PM 2.5 chart (top) is equivalent to the EPA's ambient air quality standard. Levels of PM 2.5 that exceed the EPA standard are associated with asthma or COPD attacks and hospitalizations, and are also associated with increased risk of cardiac attacks.

**These charts show dangerously high levels of smoke particulates inside the OWF impacted house at all hours of the day, especially at night, compared to normal houses.**



The charts above show hourly measurements over three consecutive days at House D (subjected to OWF smoke) as well as the average hourly measurements in houses *not* near OWFs. The straight horizontal line on the PM 2.5 chart (top) is equivalent to the EPA's ambient air quality standard. Levels of PM 2.5 that exceed the EPA standard are associated with asthma or COPD attacks and hospitalizations, and are also associated with increased risk of cardiac attacks. **These charts show dangerously high levels of smoke particulates inside the OWF impacted house at all hours of the day, especially at night, compared to normal houses.**