

Testimony of Peter Guldberg, C.C.M.  
On Outdoor Wood Furnaces  
To the Indiana Environmental Quality Service Council  
October 30, 2006

Good morning Mr. Chairman and members of the Council. My name is Peter Guldberg, President of Tech Environmental, Inc. I am appearing on behalf of Central Boiler Inc. of Greenbush, Minnesota. I have over 30 years of experience as an air pollution consultant and have studied the emissions from Outdoor Wood Furnaces (OWFs) in detail.

OWFs burn wood cleanly. When properly sited and operated, they are a clean and affordable heating source for homeowners in Indiana. For these reasons, Central Boiler opposes State regulations on the installation or use of OWFs. Because efforts to develop national emission guidelines for these heating appliances are nearing completion, the State should defer any action until the details of the US EPA Incentivized Voluntary Program (IVP) are announced, which is expected in two months.

Earlier this year, the Northeast States for Coordinated Air Use Management (NESCAUM) issued an attack piece on the outdoor wood industry with a report that is full of false and misleading information. Some State agencies have been using that report as a justification for unnecessary regulations. As an example of the problems with the NESCAUM report, I documented that they did not use proper EPA test methods for measuring Particulate Matter (PM) and as a result ended up measuring the large amount of water vapor in the plume from a furnace as PM. A point-by-point rebuttal to the NESCAUM report is included in the packet of information provided to you today.

A well-designed and properly installed OWF has essentially the same PM emissions as an EPA-certified wood stove. It should be remembered that an OWF is designed to heat an entire house on the coldest day of the year, while a wood stove is usually sized to heat only a single room. The usable heat produced by a stove or furnace is related to the quantity of wood burned, thus an appropriate measure of emissions is grams of PM per kilogram of fuel burned (g/kg, dry basis).

EPA test data for actual home use of certified Phase II wood stoves reveal they emit an average of 9.7 g/kg (dry basis).<sup>1</sup> EPA test data for actual use of a well-designed OWF demonstrate an average emission rate of 9.4 g/kg (dry basis)<sup>2</sup>. Actual in-use emission rates are essential to a proper comparison between stoves and OWFs since EPA studies have established the fact that certification limits for wood stoves do not represent actual emissions.<sup>3</sup> Tests of well-designed OWFs by EPA prove that both woodstove and OWF actual emissions are approximately 10 g/kg (dry basis).<sup>4</sup>

With respect to outdoor air quality, a properly installed OWF fully complies with National Ambient Air Quality Standards (NAAQS) for fine and coarse Particulate Matter (PM<sub>2.5</sub> and PM<sub>10</sub>), established to protect public health with a margin of safety. EPA recently lowered the 24-hour NAAQS for PM<sub>2.5</sub> to 35 µg/m<sup>3</sup>. Dispersion modeling with EPA's ISC-PRIME model was performed for a properly installed Central Boiler Model 6048 OWF, operating to heat a larger-than-average (2,800 sf) home on a cold January day in a northern State. The predicted

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<sup>1</sup> EPA, "Long-Term Performance of EPA-Certified Phase 2 Woodstoves, Klamath Falls and Portland, Oregon, 1998-1999," EPA-600/R-00-100, November 2000, p. 43, Table 3-9. Individual stoves emitted up to 20.8 g/kg in the EPA tests. Note that EPA emission factors in Publication AP-42, Emission Factors, (7.3-8.1 g/kg) are estimated from tests done in 1992 that were then scaled to the EPA certification method, which does not represent actual in-use emissions. The un-scaled 1992 field measurements on Phase II certified stoves in Crested Butte reveal actual PM emissions of 9.9-12.8 g/kg.

<sup>2</sup> EPA, "Emissions From Outdoor Wood-Burning Residential Hot Water Furnaces," EPA-600/R-98-017, February 1998, p. 26, Table 4-1a, average of Furnace B/B-3 and B-4 test results, Central Boiler, Inc. Model CS17.

<sup>3</sup> Actual in-use woodstove emissions are higher than emissions during EPA certification tests, for several reasons. Here are two quotes from EPA publications on the subject:

· "Wood stoves are designed out of necessity to pass the EPA certification test. It is generally recognized these tests do not simulate the way that a stove is used in the real world... A technician, skillful in manipulating parameters within the specifications of Method 28, can influence test results significantly."

· "It is generally felt that the low burn rate and five-minute startup procedure in Method 28 are 'artificial' in that stoves are not used in homes in a manner that approximates Method 28 low burn rate and start-up procedure. The other major comment is that stoves are designed to produce low emissions while burning dimensional lumber with fixed spacing, not cordwood loaded in a stove in a 'normal' fashion."

Homeowners do not do the air control manipulations done in a certification test, manipulations crucial to a wood stove passing the EPA certification. When a stove is refueled in the home, the wood is added, the air control might be adjusted, and the homeowner walks away. He or she does not stand at the stove repeatedly manipulating the damper for low emissions performance. Thus, actual in-home use of a wood stove produces substantially higher emissions than the EPA certification limits suggest.

<sup>4</sup> The wood stove emission rate of 9.7 g/kg is the average of 43 EPA tests on 16 certified wood stoves as they were actually operated in people's homes, and where necessary the stoves were repaired to proper working condition prior to the tests. The OWF emission rate of 9.4 g/kg is the average of 2 EPA tests of a well-designed OWF, fueled with oak cordwood and with the damper air control run by a thermostat tied to a typical winter residential heating load so that OWF operation cycled on and off, matching actual in-home use.

maximum PM<sub>2.5</sub> concentrations are all safely in compliance with the new, stringent NAAQS. We even plugged in the upset condition of high PM emissions that NESCAUM claims can occur for short periods of time, and with a properly tall stack the PM<sub>2.5</sub> concentrations comply with the NAAQS. A copy of the detailed air dispersion modeling study and results is included in your packet. These results demonstrate that a well-designed and properly installed OWF does not cause air pollution problems. When the stack height is short relative to the roof peak, however, much higher concentrations (and complaints from nearby neighbors) can result.

The real problem the OWF industry has today is that many older furnaces were installed without an adequately tall stack, and smoke sometimes will downwash onto a neighbor's property. To avoid this problem, the stack needs to be slightly higher than the roof peak of all residences within 300 feet and no stack should be closer than 100 feet horizontally to a neighbor's house. A copy of our Best Burn Practices, with stack height guidelines, is included in your packet. Neighbor complaints – which are few in number – can and should be addressed by adopting the Best Burn Practices of the industry and by requiring appropriate stack heights in situations where neighbors live close to one another. These types of complaints are best handled at the local level by using the Best Burn Practices guidance.

I recommend that the State of Indiana join Central Boiler and other members of the ASTM working group that is developing a replicable emissions test standard for OWFs, as that type of standard is an essential backbone to any emission guidelines. Finally, let me note that Central Boiler has taken a leadership role in working with EPA to develop voluntary efficiency and emission guidelines for OWFs. An announcement from EPA on those guidelines is expected in about two months and the State should defer any action on this issue until the EPA program has been allowed to take effect.

In closing, I would like to read a few excerpts from the Hoosier Homegrown Energy, Indiana's Strategic Energy Plan from 2006. As stated in the report "Indiana will spend approximately \$14 billion for imported energy in 2006 including natural gas, coal and petroleum." "Today, 75 percent of our (Indiana) energy expenditures leave the state in exchange for out-of-state coal, natural gas and oil products." "Consumers and businesses are suffering from increased costs."

People who own and operate outdoor wood furnaces properly are already contributing to the goals of the Hoosier Homegrown Energy plan. Governor Daniels and Lt. Governor Skillman apparently understand the importance of using renewable fuels to create energy independence.

Thank you for the opportunity to speak to the Council.