

IMPROVING KIDS' ENVIRONMENT



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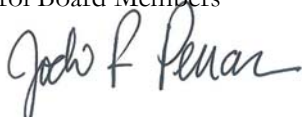
Executive Director

Jodi Perras

MEMORANDUM

Date: January 20, 2011

To: Indianapolis Air Pollution Control Board Members

From: Jodi Perras, Executive Director 

Cc: Thomas Easterly, IDEM Commissioner

Subject: Outdoor Hydronic Heater Rule

On Feb. 2, you will meet to consider again a proposed rule to regulate outdoor hydronic heaters, also known as outdoor wood boilers. Prior to your vote, please consider the information below, which summarizes some of the most recent literature published on the health effects and regulatory challenges associated with these units.

Improving Kids' Environment will be presenting three suggested amendments to the proposed rule in order to prevent what has happened in other states: a proliferation of wood-fired boilers that cause numerous health complaints from nearby residents and create a difficult environment for state regulators to address. Our proposed amendments and rationale for each are attached.

We believe Indiana's proposed rule should be strengthened in the following areas:

1. **Strengthen Stack Height Requirements:** Permanent stacks should be required to extend five feet higher than the peak of neighboring occupied buildings within 300 feet of the unit. If the owner cannot feasibly install a stack meeting these requirements, they should not be operating an OHH unit at that location.
2. **Ban Use of non-Phase 2 OHH units from May through September:** Allowing OHH operation during these months will contribute to poor air quality during the ozone season, which can have serious health effects on children, the elderly and those with respiratory diseases.
3. **Add a Nuisance Provision:** Since only trained smoke readers can accurately determine opacity, neither the unit owners nor their neighbors will be certain when a unit is in compliance. IDEM does not have capacity to provide inspectors to monitor operations and take smoke readings at multiple homes around the state. We request that the board add a nuisance provision specific to OHH units that will provide clear operating guidelines to the owners of these units and the ability to monitor compliance with cameras, similar to Maine's requirements described below.

Proposed Stack Height Requirements

326 IAC 4-3-4 General requirements for existing outdoor hydronic heaters

Authority: IC 13-17-1-1; IC 13-17-3-4; IC 13-14-8-7

Affected: IC 13-17-1-3; IC 13-17-3

Sec. 4. (a) After August 31, 2011, all outdoor hydronic heaters that have not been certified to meet the Phase 2 emission limit in section 3 of this rule must have a permanent stack extending five (5) feet higher than the peak of the roof of any occupied building:

- (1) located within ~~one hundred fifty~~ three hundred (300150) feet of the unit;
- and
- (2) not located on the same property on which the heater is installed.

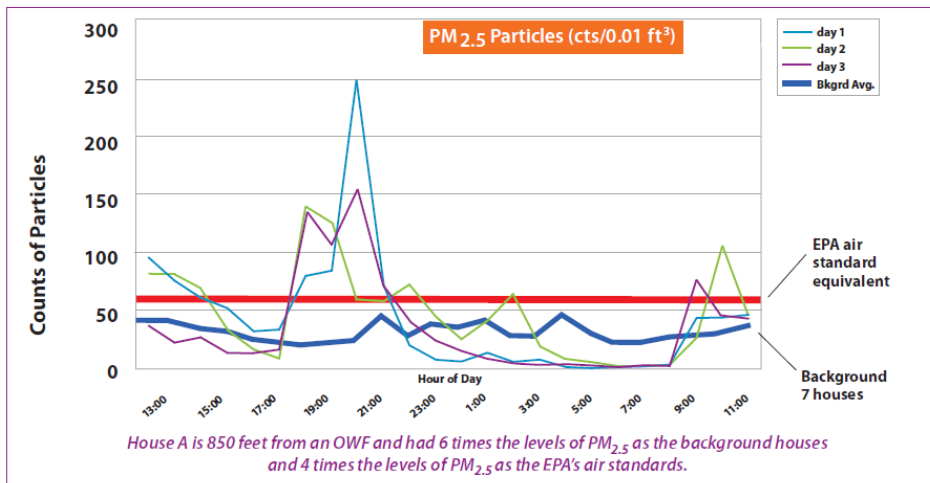
~~(b) The maximum stack height required under this rule is twenty-two feet above the ground.~~ (Air Pollution Control Board; 326 IAC 4-3-4)

Justification:

Recent research has shown that smoke particles enter neighboring homes and accumulate. Environment and Human Health, Inc., based in North Haven, Conn., published a study in November 2010, *The Dangers to Health from Outdoor Wood Furnaces*. This study performed PM monitoring inside homes at varying distances from outdoor wood furnaces. It concluded that, "Wood smoke contains particles that are so small they cannot be kept out of homes, even tightly built homes. The smoke particles enter through the windows and the doors and remain in the homes for long periods of time, impacting a family's health." (Brown, EHHL, November 2010, page 6.) **Even homes 850 feet away from the furnace had PM_{2.5} levels four times above EPA's health standard for outdoor air.** See the charts below.

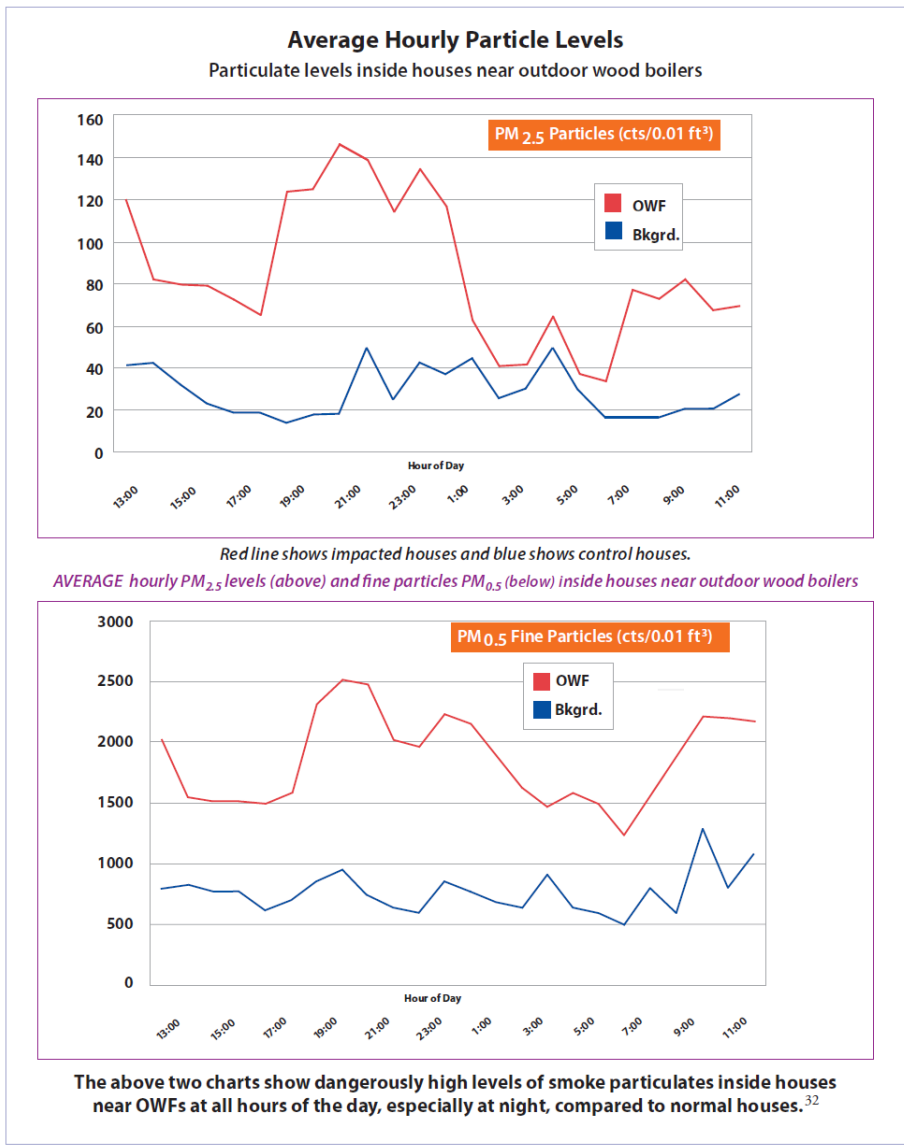
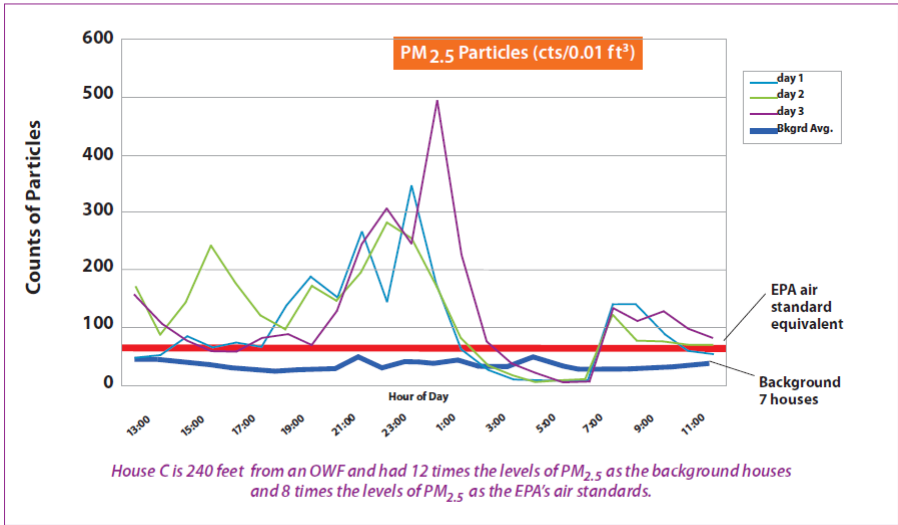
House A

Distance = 850 feet from the neighboring Outdoor Wood Furnace, Litchfield County, Connecticut



House C

Distance = 240 feet from the neighboring Outdoor Wood Furnace, Windham County, Connecticut



The January 2011 edition of *em*, a publication of the Air and Waste Management Association, was devoted to health effects and regulatory challenges associated with outdoor wood boilers. “Unique attributes of OWBs can serve to exacerbate the exposure dynamic. These include *short stack exit heights capable of fumigating and impinging at the ground-level* (emphasis added), generation of exceptionally high criteria pollutant (e.g., PM) and HAP emission concentrations, intermittent oxygen-starved operating modes conducive to the formation of high molecular weight organic compounds, large firebox capacities to accommodate trash burning, as well as other undesirable fuels, and continuous 24-hour and four-season use.” (Johnson in *em*, January 2011, page 10.)

“Diurnal and multi-day atmospheric inversions that trap pollutants beneath a low boundary layer can give rise to elevated ground-level emissions over sustained periods. The potential for large-scale exposures during these events occurs wherever high densities of humans dwell and burn wood in geographic catchment areas, such as river basins, valleys, and mountainous terrain in both nonurban and urban settings. Under these conditions a small number of RWC (residential wood combustion) devices can contaminate an entire airshed.” (Johnson in *em*, January 2011, page 10.)

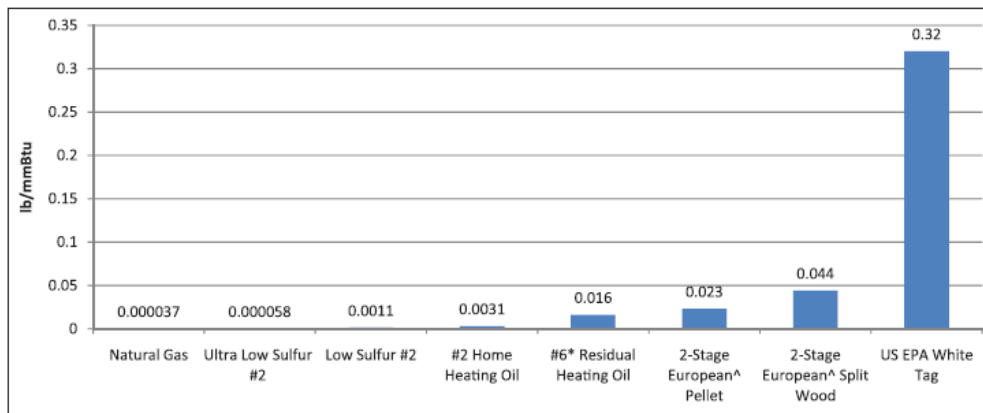
Proposal to Ban Use of OWB Units in May and September

Sec. 5. (a) No person shall operate an outdoor hydronic heater from ~~June~~ May 1 through ~~August~~ September 30~~31~~ if the unit is located less than three hundred (300) feet away from an occupied building not located on the same property on which the heater is installed, unless the outdoor hydronic heater has been certified to meet the Phase 2 emission limit in section 3 of this rule.

Justification:

As noted in the EHHI study, “As the use of outdoor wood furnaces has increased, so has the number of complaints. Neighbors have reported serious health impacts, including reduced lung function, increased asthma attacks, headaches, sinusitis, bronchitis and pneumonia. Many of the components of wood smoke are carcinogenic—and wood smoke as a whole can aggravate heart disease.” (Brown, EHHI, page 6)

We are concerned that Indiana sees the EPA Phase 2 guidelines as a solution to the problem of pollution from OWB units. While Phase 2 units emit about half as much pollution as Phase I units, they still produce many more pounds of PM2.5 emissions per mmBtu than other heat sources. In *em* magazine, Nathan A. Russell and Ellen G. Burkhard of the New York State Energy Research and Development Authority summarize work they’ve done to help manufacturers develop more efficient units. The chart below compares PM2.5 emissions from residential heating fuels used in residential boiler systems, both wood-fired and fossil-fueled. Phase 1 units, which will still be in operation, emit up to .60 lb/mmBtu. European units produce significantly fewer emissions than the EPA-approved U.S. models. (Russell in *em*, January 2011, page 22.)



Note: US EPA “White Tag” units are Phase 2 units.

Proposed Nuisance Provision

We suggest the nuisance language shown below be added to 326 IAC 4-3-5:

No person shall cause or allow emissions of air contaminants from an outdoor hydronic heater to the outdoor atmosphere of a quantity, characteristic or duration which is injurious to human, plant or animal life or to property, or which unreasonably interferes with the comfortable enjoyment of life or property. This prohibition applies, but is not limited to, the following conditions:

- (1) activating smoke detectors in neighboring structures;**
- (2) impairing visibility on a public highway; or**
- (3) causing a visible plume migrating from an outdoor wood boiler and contacting an occupied building on an adjacent property, measured as any opacity totaling twelve minutes in any hour.**

Justification:

In *Controlling Outdoor Wood Boilers in Maine: One Regulator's Perspective*, Lou Fontaine of Maine DEP describes the evolution of Maine's approach to OWB units since the first complaint was received in 1998. Maine was one of the first states to regulate outdoor wood boilers. Maine's rule contains an important compliance tool missing from the proposed Indiana rules:

No OWB, regardless of the date of installation, is allowed to operate when conditions cause any visible smoke plume to cross onto adjacent owner's land and buildings for 12 minutes or more in any hour. **Sending smoke on adjacent land or buildings for 12 minutes or more is a nuisance and a violation of the regulation.** Maine uses remote, time-lapse cameras to document violations of this standard, and also accepts videos provided by neighboring homeowners if they meet the Department's standards. Official warnings have led some boiler owners to improve operations or cease using the boiler completely. (Fontaine in em, January 2011, pages 28-29.)

Indiana's rule will need to be enforced. With IDEM's limited number of inspectors and enforcement resources, OWB complaints will continue to cause problems. Incorporating nuisance provisions that can be monitored with remote cameras or home video will give IDEM cost-effective tools to work with OWB owners to reduce at least some impacts on their neighbors.

Maine Nuisance Provisions

Nuisance. "Nuisance" means emission of air contaminants to the outdoor atmosphere of such quantity, characteristic or duration that may be injurious to human, plant or animal life or to property, or that unreasonably interferes with the comfortable enjoyment of life or property.

- A. Standard.** No person shall operate an outdoor wood boiler or an outdoor pellet boiler, that produces visible emissions, measured as any opacity totaling twelve minutes in any hour, that cross onto any land or buildings immediately adjacent to a dwelling or commercial building not owned by the owner of the outdoor wood boiler. Opacity under this subsection shall be determined pursuant to EPA Method 22 Visual Determination of Fugitive Emissions from Material Sources and Smoke Emissions from Flares (40CFR60, Appendix A).
- B. Prohibition.** No person shall operate an outdoor wood boiler or an outdoor pellet boiler, in such a manner as to create a nuisance.

References:

Brown, David R. *The Dangers to Health from Outdoor Wood Furnaces*. Environment and Human Health, Inc., North Haven, Conn., 2010.

Fontaine, Louis. *Controlling Outdoor Wood Boilers in Maine: One Regulator's Perspective*, em magazine, Air and Waste Management Association, January 2011, pp. 27-29.

Russell, Nathan A. and Burkhard, Ellen G. *Getting There: High Efficiency and Low-Emissions Wood Heating*. em magazine, Air and Waste Management Association, January 2011, pp. 19-22.

Johnson, Philip R. S. *Adverse Health Effects, Exposure Threats, and Regulatory Challenges Relating to Outdoor Wood Boilers and Residential Wood Combustion*. em magazine, Air and Waste Management Association, January 2011, pp. 8-12.

About the Authors Cited:

David R. Brown, Sc.D., is a public health toxicologist at Environment and Human Health, Inc.

Louis Fontaine has worked for the Maine Department of Environmental Protection for 32 years. He has managed the compliance program for the Bureau of Air Quality since 1991. He and his staff are responsible for monitoring compliance with Maine's air pollution laws and responding to complaints throughout the state. Fontaine has participated in outdoor wood boiler workgroups with NESCAUM, EPA and ASTM.

Philip R. S. Johnson is a senior officer with the Heinz Endowment's Environment Program and a former senior scientist and program manager for NESCAUM, the Northeastern States for Coordinated Air Use Management.

Nathan A. Russell is assistant project manager for energy efficiency research and development, and Ellen G. Burkhard, Ph.D., is senior project manager for environmental research and development, both with the New York State Energy Research and Development Authority (NYSERDA).