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TITLE 326 AIR POLLUTION CONTROL BOARD

CONTINUATION OF FIRST NOTICE OF COMMENT PERIOD LSA Document #05-332(APCB)

DEVELOPMENT OF NEW RULES CONCERNING REGULATIONS OF EMISSIONS FROM OUTDOOR WOOD BOILERS

PURPOSE OF NOTICE

A First Notice of Comment Period was published in the December 1, 2005, Indiana Register (29 IR 901), soliciting public comment on new rule 326 IAC 4-3 concerning regulation of emissions from outdoor wood boilers. The Indiana Department of Environmental Management (IDEM) has received numerous requests for an extension of the comment time so that all interested parties could have additional opportunity to provide comments. Therefore, IDEM is providing this extension for submission of comments on the development of new rules concerning the regulation of emissions from outdoor wood boilers. Comments submitted to IDEM from the original comment period deadline through March 3, 2006, will be considered to be received as part of the formal written comment period.

HISTORY

First Notice of Comment Period: December 1, 2005, Indiana Register (29 IR 901). Comment period ended January 3, 2006.

CITATIONS AFFECTED: 326 IAC 4-3.

AUTHORITY: IC 13-14-8; IC 13-17-3-1; IC 13-17-3-4.

SUBJECT MATTER AND BASIC PURPOSE OF RULEMAKING

Basic Purpose and Background

In an effort to control heating costs, homeowners are increasingly turning to outdoor wood boilers to heat their homes. These units are typically many times larger than an indoor wood stove and are reported to have significantly higher emissions of particulate matter. Currently, outdoor wood boilers are not regulated in Indiana or at the national level. The department has received numerous complaints concerning smoke from outdoor wood boilers in residential areas and has received requests to develop regulations for the units.

Outdoor wood boilers are free standing woodburning appliances that heat water, which is then pumped underground to provide heat to a structure or multiple structures. An outdoor wood boiler can also be used to provide hot water year-round. Units are typically the size of a small wood shed or minibarn. They can heat buildings ranging in size from one thousand eight hundred (1,800) to twenty thousand (20,000) square feet. Outdoor wood boilers are much larger and differ in design, operation, and emissions produced from the much smaller indoor wood stoves, pellet stoves, fireplaces, and barbecue pits. Some outdoor wood boilers have auxiliary units or attachments that allow gas, oil, or coal to be burned in addition to wood.

Larger capacity, low stack heights, design differences, operating conditions, and lower operating temperatures cause more intense smoking and smoldering conditions nearer to ground level than in other woodburning devices. These factors have led citizens to complain to IDEM about certain outdoor wood boilers.

Stack heights on outdoor wood boilers are typically in the range of eight (8) to ten (10) feet above ground level. Chimneys on homes are almost always above the roof line and are typically twenty (20) to thirty (30) feet above ground level. The lower stack heights decrease the opportunity for wood smoke to disperse, to some extent, in the surrounding air before affecting nearby individuals and residences at ground level.

The basic design of outdoor wood boilers causes fuel to burn incompletely, or smolder, which can result in thick smoke and high particulate emissions. The firebox in most outdoor wood boilers is surrounded by a water filled jacket. The fire in the combustion chamber heats the water, but at the same time that water surrounding the firebox cools temperatures in the combustion chamber. Cooler combustion temperatures result in incomplete combustion, causing the fire to smoke. Problems are aggravated if an outdoor wood boiler is not sited properly or not operated according to manufacturers' recommendations.

Another design feature of outdoor wood boilers that results in increased emissions is the way the units cycle on and off. Unlike natural gas and oil furnaces, outdoor wood boilers are not designed to cut off the fuel supply when heat is no longer required. The units are designed to slow combustion by significantly reducing the air supply to the combustion chamber. This results in a slow burning, smoldering fire that causes creosote to form on the inside of the firebox. When heat is again required from the unit, the air flow is restored and the rekindled fire then burns the accumulated creosote, resulting in thick smoke and increased pollutant emissions.

As a result of the factors listed above, outdoor wood boilers have much higher emissions than other home heating devices. According to a 1998 United States Environmental Protection Agency (U.S. EPA) report summarizing research on the issue, particulate matter and polycyclic aromatic hydrocarbon (PAH, a toxic pollutant) emissions are much higher for all woodburning devices than for other home heating appliances, such as oil or natural gas furnaces.

Among woodburning appliances, outdoor wood boilers have the highest emissions of particulate matter and PAHs. Pellet stoves have the lowest emissions. According to a 2005 report issued by the New York State Office of Attorney General, outdoor wood boiler emissions of fine particulate matter (particulate matter smaller than two and five-tenths (2.5) microns, or $PM_{2.5}$) range from eighteen (18) to one hundred forty-seven (147) grams per hour. The 2005 report summarized data from U.S. EPA emissions tests as well as manufacturer supplied emissions tests and found the average outdoor wood boiler to emit seventy-two (72) grams per hour. In comparison, indoor U.S. EPA certified wood stoves emit an average of about six (6) grams of $PM_{2.5}$ per hour.

Pollutants in the emissions from outdoor wood boilers include $PM_{2.5}$, carbon monoxide, and toxic volatile organic compounds including formaldehyde, benzene, PAHs, and a number of trace chemicals.

Smoke is a primary complaint from residents who live near outdoor wood boilers. Temperature inversions cause smoke to stay close to the ground. The smoke drifts across property lines and penetrates adjacent structures. It can also drift across nearby roadways and block visibility for drivers.

Wood smoke is a primary source of particulate matter emissions. Fine particulate matter ($PM_{2.5}$) is a health concern due to the direct correlation between exposure to $PM_{2.5}$ and an increased risk of respiratory problems, cardiovascular problems, and even premature death. Medical studies show that individuals with preexisting medical conditions, in addition to children and older adults, are especially vulnerable to the health effects of exposure to $PM_{2.5}$. Areas that do not meet the $PM_{2.5}$ health standard or that contribute to areas that do not meet the standard are designated by the U.S. EPA as “nonattainment” areas. Indiana’s $PM_{2.5}$ nonattainment areas include Lake, Porter, Marion, Hamilton, Hendricks, Morgan, Johnson, Clark, Floyd, Vanderburgh, Dubois, and Warrick counties, as well as portions of Gibson, Pike, Spencer, Jefferson, and Dearborn counties.

New York, Connecticut, Maryland, Massachusetts, Michigan, New Jersey, Vermont, and the Northeast States for Coordinated Air Use Management (NESCAUM) have filed a petition to the U.S. EPA seeking regulations of outdoor wood boilers. U.S. EPA has tested some outdoor wood boilers. The overall efficiency is approximately fifty percent (50%) of the thermal energy of the wood. For comparison purposes, the efficiency of a fireplace may be as low as ten percent (10%). According to the U.S. Federal Energy Management Program, the thermal energy-efficiency of a base model gas-fired water industrial boiler is seventy-eight percent (78%). Most modern hot air furnaces have a thermal energy efficiency of about eighty percent (80%).

The U.S. EPA has regulated “wood heaters”, which are defined as “an enclosed, woodburning appliance capable of and intended for space heating and domestic water heating...” (40 CFR, Part 60, Subpart AAA, 60.530) under standards that have been in effect for all wood heaters manufactured and sold at retail since July 1, 1992 (40 CFR, Part 60, Subpart AAA 60.533). These standards exempt outdoor wood boilers. Since outdoor wood boilers are not regulated by U.S. EPA, some local ordinances have been adopted to ban their use, such as in the city of Petersburg, Indiana, where “the Common Council has concluded that burning wood or any other flammable material in outdoor fired furnaces produces an array of harmful chemicals, including carbon monoxide, hydrocarbons, formaldehyde, and at least 100 other harmful compounds”.

Other rules and regulations addressing emissions from outdoor wood boilers have been adopted at the state level. Vermont has proposed regulations for outdoor wood-fired boilers and they are on schedule to become effective after the Vermont legislative session. Vermont passed standards on water stoves, another name used for outdoor wood boilers, in 1997 prohibiting them from being located closer than two hundred (200) feet to another residence and requiring an increased stack height for water stoves closer than five hundred (500) feet. However, citizen complaints continued. Vermont’s proposed rules are more stringent, including emission limits and sales regulations. The Connecticut legislature has passed an act concerning outdoor woodburning furnaces that include the requirement to use manufacturers’ recommendations, stack heights, and siting restrictions.

Alternatives To Be Considered Within the Rulemaking

Approaches to regulating outdoor wood boilers include the following:

Alternative 1. Establish emission standards for outdoor wood boilers.

Particulate emissions can be very high. There are also emissions of carbon dioxide and volatile organic compounds.

- Is this alternative an incorporation of federal standards, either by reference or full text incorporation? No.
- Is this alternative imposed by federal law or is there a comparable federal law? No.
- If it is a federal requirement, is it different from federal law? Not applicable.

- If it is different, describe the differences. Not applicable.

Alternative 2. Restrict type of and use of outdoor wood boilers

Examples include requiring minimum stack heights, minimum setbacks from homes or other structures, the following of manufacturer recommendations, and the restriction of moisture content of wood that can be burned.

- Is this alternative an incorporation of federal standards, either by reference or full text incorporation? No.
- Is this alternative imposed by federal law or is there a comparable federal law? No.
- If it is a federal requirement, is it different from federal law? Not applicable.
- If it is different, describe the differences. Not applicable.

Alternative 3. Ban outdoor wood boilers or partial ban on types of outdoor wood boilers

Examples include banning the use except for primary heating of the home, banning the use in residential neighborhoods, or banning the use on particular days or times of the day. Such a ban could also grandfather existing furnaces.

- Is this alternative an incorporation of federal standards, either by reference or full text incorporation? No.
- Is this alternative imposed by federal law or is there a comparable federal law? No.
- If it is a federal requirement, is it different from federal law? Not applicable.
- If it is different, describe the differences. Not applicable.

Alternative 4. A Combination of Alternatives 1 through 3

- Is this alternative an incorporation of federal standards, either by reference or full text incorporation? No.
- Is this alternative imposed by federal law or is there a comparable federal law? No.
- If it is a federal requirement, is it different from federal law? Not applicable.
- If it is different, describe the differences. Not applicable.

Alternative 5. Do Not Adopt a Statewide Rule

- Is this alternative an incorporation of federal standards, either by reference or full text incorporation? No.
- Is this alternative imposed by federal law or is there a comparable federal law? No.
- If it is a federal requirement, is it different from federal law? Not applicable.
- If it is different, describe the differences. Not applicable.

Applicable Federal Law

This rulemaking is not based on federal law. However, U.S. EPA has a voluntary residential wood smoke reductions initiative that targets emissions from indoor wood stoves.

Potential Fiscal Impact

The potential fiscal impact depends on the alternative approaches selected. For example, for an owner to comply with any of the alternatives, it may mean buying a new outdoor wood boiler or not being able to use an outdoor wood boiler that the owner has already purchased. The cost of an outdoor wood boiler ranges from three thousand dollars (\$3,000) to ten thousand dollars (\$10,000) depending on size and capacity. Owners or users of outdoor wood boilers can typically save between forty percent (40%) to seventy percent (70%) compared to other types of heating equipment, but savings vary widely from year to year, by region, and are based on the individual owner's furnace and how the owner uses it.

The cost of restrictions or partial ban is more difficult to determine. It may be as low as a few hundred dollars to modify a stack height or may result in modifications such as re-siting the furnace that may cost many hundreds of dollars. It is possible that the entire outdoor wood boiler for an owner would have to be entirely replaced because the existing one could not be modified. However, there would still be cost-savings and benefits due to newer models being more efficient.

Similarly, the cost of a decision to not adopt a statewide rule is difficult to determine. Individuals with access to free wood for fuel, and who have the time and physical ability to cut, transport, stack, and load the wood, may enjoy significant cost savings over other home heating sources within a few years of purchasing an outdoor wood boiler. However, there are potentially significant costs to the larger community if no statewide rule is adopted. Emissions from outdoor wood boilers may contribute to violations of the fine particulate matter (PM_{2.5}) health standard established by the U.S. EPA. If an area within the state, usually by county, has violated the standard or is found to contribute to another area's violation of the standard, it is required to be designated by the U.S. EPA as a nonattainment area for PM_{2.5}. If an area is designated as being in nonattainment for PM_{2.5}, then state and local governments are required to take additional steps to reduce particulate matter levels. The state is required to detail the steps taken to reduce particulate matter emissions in order to meet the National Ambient Air Quality Standards in a State Implementation Plan (SIP), submitted to the U.S. EPA. More restrictive air permitting in a nonattainment area can influence expansion and other development decisions for local businesses as well as possible plans for new industry development. As noted above, there are twelve (12) counties and five (5) partial counties in Indiana that are currently designated as nonattainment for PM_{2.5}.

The cost of wood for outdoor wood boilers can vary widely depending on the type and availability of wood. If clean burning wood is required, the cost would depend on the difficulty of acquiring the new wood versus the existing noncompliant wood. Wood on average for the nation costs six-thousandths of a dollar (\$0.006) per one thousand (1,000) British Thermal Units (BTU) compared to natural gas (2004) at seven-thousandths of a dollar (\$0.007) per one thousand (1,000) BTU, propane at sixteen-thousandths of a

dollar (\$0.016) per one thousand (1,000) BTU, and electric heat at twenty-six thousandths of a dollar (\$0.026) per one thousand (1,000) BTU. However, these costs vary widely depending on the region of the country and current supplies. Health impacts and environmental damage resulting from emissions from outdoor wood boilers have not been quantified.

Small Business Assistance Information

IDEM established a compliance and technical assistance (CTAP) program under IC 13-28-3. The program provides assistance to small businesses and information regarding compliance with environmental regulations. In accordance with IC 13-28-3 and IC 13-28-5, there is a Small Business Assistance Program Ombudsman to provide a point of contact for small businesses affected by environmental regulations. Information on the CTAP program, the monthly CTAP newsletter, and other resources available can be found at www.in.gov/idem/ctap.

Small businesses affected by this rulemaking may contact the Small Business Regulatory Coordinator:

Sandra El-Yusuf

IDEM Compliance and Technical Assistance Program

OPPTA - MC60-04

100 N. Senate Avenue

W-041

Indianapolis, IN 46204-2251

(317) 232-8578

selyusuf@idem.in.gov

The Small Business Assistance Program Ombudsman is:

Eric Levenhagen

IDEM Small Business Assistance Program Ombudsman

External Affairs - MC50-01

100 N. Senate Avenue

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STATUTORY AND REGULATORY REQUIREMENTS

IC 13-14-8-4 requires the board to consider the following factors in promulgating rules:

- (1) All existing physical conditions and the character of the area affected.
- (2) Past, present, and probable future uses of the area, including the character of the uses of surrounding areas.
- (3) Zoning classifications.
- (4) The nature of the existing air quality or existing water quality, as the case may be.
- (5) Technical feasibility, including the quality conditions that could reasonably be achieved through coordinated control of all factors affecting the quality.
- (6) Economic reasonableness of measuring or reducing any particular type of pollution.
- (7) The right of all persons to an environment sufficiently uncontaminated as not to be injurious to human, plant, animal, or aquatic life or to the reasonable enjoyment of life and property.

REQUEST FOR PUBLIC COMMENTS

At this time, IDEM solicits the following:

- (1) The submission of alternative ways to achieve the purpose of the rule.
- (2) The submission of suggestions for the development of draft rule language.

Mailed comments should be addressed to:

#05-332(APCB) Outdoor wood boilers

Sean Gorman Mail Code 61-50

c/o Administrative Assistant

Rules Development Section

Office of Air Quality

Indiana Department of Environmental Management

100 North Senate Avenue

Indianapolis, Indiana 46204.

Hand delivered comments will be accepted by the IDEM receptionist on duty at the tenth floor reception desk, Office of Air Quality, Indiana Government Center-North, 100 North Senate Avenue, Indianapolis, Indiana.

Comments may be submitted by facsimile at the IDEM fax number: (317) 233-2342 or (317) 233-5967, Monday through Friday, between 8:15 a.m. and 4:45 p.m. Please confirm the timely receipt of faxed comments by calling the Rules Section at (317) 233-0426.

COMMENT PERIOD DEADLINE

Comments must be postmarked, faxed, or hand delivered by March 3, 2006.

Additional information regarding this action may be obtained from Sean Gorman, Rules Development Section, Office of Air Quality, (317) 234-3533 or (800) 451-6027 (in Indiana).

Kathryn A. Watson, Chief
Air Programs Branch
Office of Air Quality