Air Toxics Advisory Committee

Position Paper on Outdoor Wood Boilers (OWBs)

Position Summary

The Air Toxics Advisory Committee (ATAC) joins the American Lung Association and several states in a call for meaningful regulation of outdoor wood boilers (OWBs) or in the absence of regulation, a moratorium on the sale of these units until such time as emission standards are established that meet or exceed particulate matter standards established under 40 CFR 60 Subpart AAA-*Standards of Performance for New Residential Wood Heaters* or a manufacturer demonstrates to the satisfaction of the Maine Department of Environmental Protection, the ability to meet or exceed particulate matter standards established under 40 CFR 60 Subpart AAA.

OWBs emit significant levels of air toxic compounds, particulate matter, volatile organic compounds, and other pollutants. Many of these pollutants are emitted in excessive quantities compared to other forms of residential combustion. The growing popularity of these units may have a significant detrimental impact on Maine's air quality and more importantly, because of their location near homes and poor dispersion characteristics, the most sensitive members of Maine's population may be at greatest risk. The American Lung Association of Maine (2006) considers OWBs to be "an emerging health threat" and "strongly cautions against the use of outdoor wood boilers for residential heating purposes." ATAC has reached the same conclusions and urges the Maine Department of Environmental Protection to review and implement the recommendations presented. Furthermore, it is important to take action now to prevent air quality problems associated with OWBs from expanding as demand for OWBs increases.

Background

What is an outdoor wood boiler (OWB)?

A typical OWB is used as an alternative home or commercial heating source for such items as domestic hot water, forced hot water heating, and pool heaters. An OWB consists of a small metal shed within which is a fire box designed for the combustion of wood. The fire box is surrounded by a water jacket. The combustion of wood heats the water within the water jacket. A thermostat regulates the circulation of heated water through underground piping to the home, pool, or other source on a demand basis, meaning that a damper cycles open and closed to modulate heat requirements. Smoke is typically directed through a short stack (chimney) extending a few feet above the roof of the shed. An owner

generally loads the firebox once or twice a day. The OWB thermostat cycles the damper on and off throughout the day to maintain the desired water temperature.

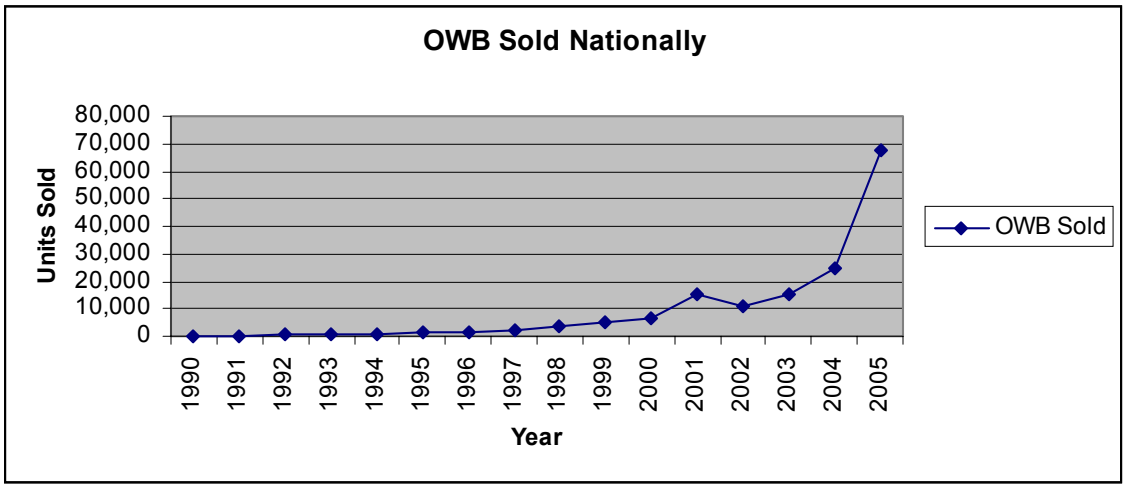
Why is ATAC involved with the review of OWBs?

ATAC is in the process of evaluating a number of source categories through subcommittees as part of Phase II of the Maine Air Toxics Initiative. This review includes the development of both short and long-term recommendations for assessing, evaluating, and if necessary reducing air toxics in Maine. Wood smoke contains particulate matter, volatile organic compounds, polycyclic organic matter (POM), polycyclic aromatic hydrocarbons (PAH), and other hazardous components. The health effects of these compounds are well documented and include cancer, respiratory illness, arteriosclerosis, and asthma to name a few.

The Stationary Source Subcommittee (SSS) found that OWBs represent a source category not specifically included in the Phase I MATI inventory because the national and state inventories relied upon to create the MATI Priority List did not include OWBs. However, the Phase II evaluation indicates that OWBs represent a significant concern because of their emission characteristics and the growing popularity of these units.

Figure 1 shows the national trend in sales of OWB since 1990.(NESCAUM, 2006a). It is estimated that the number of OWB sold in Maine since 1990 is 1,968. (NESCAUM, 2006b).

Figure 1. – OWB Sales Trends



If the growth rate remains constant at the 2004 – 2005 pace, the total number of OWBs in Maine in 2010 would be 6,228. However, if the growth rate continues to increase exponentially over the period the total number of OWBs would be as much as ten times higher.

Why are OWBs an emerging concern?

Simply put, OWBs release far more emissions than other forms of combustion used in residential heating. Moreover, due to their growing popularity among homeowners these units release emissions in residential areas where children, those with compromised immune systems, and the elderly live, potentially impacting the most sensitive members of Maine's population. The characteristically short stack contributes to the problem by limiting dispersion of pollutants.

Why do these units pose a greater threat than woodstoves or fireplaces?

The design of OWBs promotes low temperature/low oxygen smoldering combustion. The water jacket keeps the combustion chamber below 1,000 degrees (Woodheat.org, n.d.). This low temperature burn and reduced oxygen environment results in incomplete combustion. As the system cycles to maintain heat load requirements, the combustion gases and particulate matter are discharged to the atmosphere through a smoke stack. The pollutant load is considerably higher for OWBs than woodstoves or fireplaces due to these poor combustion design characteristics. The characteristically short stack reduces dispersion of the high pollutant load unlike an in-home fireplace or woodstove where the emissions are released above the height of the home. Most complaints from residents living adjacent to an OWB involve nuisance complaints about excessive smoke. Complaints filed with the Bureau of Air Quality have increased dramatically in 2005 and 2006. Table 1 provides a brief summary of officially logged and investigated complaints.

The complaints confirm the "smokey" nature of these units and while the majority of complaints address smoke, residents may not be aware of the significant health effects associated with wood smoke, seeing OWBs as simply a local nuisance. "Wood smoke contains many organic compounds known to cause cancer (such as benzopyrenes, dibenzoanthracines, and dibenzocarbazoles), and other toxic compounds (such as aldehydes, phenols, or cresols)" (Washington State Department of Ecology, 1997b).

This in itself is a significant concern. The Washington State Department of Ecology (1997a) reports that the size of particulate matter in wood smoke is "so small that it is not stopped by closed doors and windows, and often seeps into neighbors' houses."

This characteristic of wood smoke is a major concern for sensitive populations such as children, the elderly, and individuals with asthma and other health conditions. The Connecticut Department of Environmental Protection (2005a) compared particulate matter (PM) emissions from EPA certified woodstoves and OWBs with homes heated with natural gas and determined that an EPA certified woodstove produces the same amount of PM as 2,000 homes heated with natural gas. However, the study also found that a home heated with an OWB may produce as much PM as 3,000 to 8,000 homes heated with natural gas. It should be clear that a small increase in the number of OWBs could significantly undermine emission reduction efforts associated with residential wood combustion.

Table 1- **Complaints Related to Outdoor Wood Boilers**

Date	*Municipality*	*Nature of Complaint - Notes*
02/27/04	Gorham	Smoke-nuisance
01/03/05	Machias	Smoke/visible emissions
04/06/05	Searsmont	Multiple complaints (commercial installation)
04/12/05	Searsmont	Original complaint dates back to 3/13/02
06/18/98 -06/17/05	West Rockport	Smoke-nuisance (commercial installation)
06/20/05	Rockport	Smoke – nuisance, multiple complaints
06/22/05	Mapleton	Smoke sets off smoke alarm in neighbors house
08/04/05	Bangor	Smoke – nuisance
09/15/05	Hampden	Smoke – nuisance
10/21/05	Kingfield	Multiple complaints
10/31/05	Kingfield	Multiple complaints
11/10/05	Whitefield	Burning trash in OWB; multiple complaints
11/29/05	Presque Isle	Multiple complaints; installing propane secondary burner
12/20/05	Wells	Smoke – nuisance
12/21/05	Wells	Smoke-nuisance (commercial installation)
2005	Eddington	Smoke-nuisance
Winter 05-06	Gorham	Smoke-nuisance
01/03/06	Benton	Smoke – nuisance
01/03/06	Machias	Smoke-nuisance
01/10/06	Benton	Smoke-nuisance
02/06/06	Sanford	Smoke-nuisance (commercial installation)
02/14/06	South Berwick	Smoke-nuisance
02/15/06	So. Berwick	Burning treated wood and other waste, town gets 3 calls/week
02/21/06	Saco	Smoke-nuisance
02/28/06	Presque Isle	Smoke – nuisance
02/28/06	Quimby	Smoke-nuisance
03/10/06	Eddington	Smoke – nuisance
03/13/06	Auburn	Numerous complaints; installing propane burner
03/20/06	Presque Isle	Smoke-nuisance
03/31/06	Searsmont	Multiple complaints (commercial installation)
04/10/06	Beals Island	Alleged aggravation of bronchitis
04/28/06	Greenville	Smoke sets off smoke alarm in neighbors house
05/01/06	South Portland	Smoke - nuisance
05/01/06	Greenville	Smoke-nuisance (commercial installation)
05/15/06	Eddington	Multiple complaints
05/15/06	Edgecomb	Smoke-nuisance
06/22/06	Mapleton	Smoke-nuisance
01/26/06	Saco	Smoke – Offensive odor
08/17/06	Bowdoinham	Smoke-nuisance (commercial installation)
09/07/06	Belmont	Smoke-nuisance
09/27/06	Jefferson	Smoke-nuisance

Emission Impacts and Health Impacts

Has testing been performed to support claims of excessive emissions from OWBs?

OWBs are a relatively new concern; documentation on emissions only extends back to the mid 90s. The type of air toxics emissions from OWBs is expected to be similar in composition to emissions from residential woodstoves, which have been more extensively studied. The MATI inventory identified the category of polycyclic organic matter (POM) as the class of hazardous air pollutants of greatest concern from residential woodstoves. In its evaluation of HAP emissions from OWBs, New York State compiled a summary of results of testing of OWBs and residential woodstoves both in terms of fine particulate matter ($PM_{2.5}$) and polycyclic aromatic hydrocarbons (PAH). PAH is considered a subcategory of POM as used in the MATI process. It is also important to note that the MATI process did not focus on $PM_{2.5}$. Table 2 provides a summary of the comparative emissions between OWBs and various categories of residential woodstoves.

Table 2- Comparison of Emissions from Residential Wood Combustor Types (Schreiber, 2005a)

Type of Wood Combustion Unit	PM2.5 (Average) *(grams/hour)*	PAH (Average) *(grams/hour)*
OWB	71.6	0.96
Conventional (non-EPA Certified Woodstove)	18.5	0.36
EPA Certified – Catalytic Woodstove	6.2	0.15
EPA Certified – Non-Catalytic Woodstove	6.0	0.14
EPA Phase II Certified Woodstove		
Catalytic	4.1	N/A
Non-Catalytic	7.5	N/A

This summary indicates that OWBs emit PAH at a rate about 6 times greater than would be emitted form an EPA certified woodstove and almost 3 times more than a conventional, non-EPA certified woodstove. These results are similar to results from a 1998 EPA study that demonstrated that OWBs may emit 4.3 times to 18.8 times more PAH than non-catalytic woodstoves and 3.9 to 16.9 times more than catalytic woodstoves (NESCAUM, 2006c).

In terms of $PM_{2.5}$, one OWB emits as much as 2 heavy duty diesel trucks, 45 passenger cars or 1000 oil furnaces (Schreiber, 2005b). In terms of POM, one OWB emits as much as 100,000 residential furnaces burning distillate oil (* 1999 NEI – ERG, 2003 and assumed capacity of 139,000 Btu/hr).

What are the health impacts from these pollutants?

Northeast States for Coordinated Air Use Management (NESCAUM), of which Maine is a member, conducted "in use" testing of a 250,000 Btu/hr OWB in June 2005, using a continuous monitor (using light scattering) and a modified EPA Method 17 sampling train. The average of all particulate filter samples was 93 g/hr with a range of 13 to 237 g/hr, while that from the continuous monitor was 161 g/hr. The higher emissions associated with the continuous monitor was believed to be the result of the inability of the filter methodology to capture condensable particulate matter (NESCAUM, 2006d). The NESCAUM testing confirmed the emission estimates used to compare OWBs with other residential heating options.

In March 2005, NESCAUM conducted a screening level evaluation of the ambient air impact associated with particulate emissions from an OWB in central New York State using a portable nephelometer (light scattering). The OWB burned a combination of seasoned hardwood (1 year) and split oak, which was seasoned for only 3-4 months. The monitor recorded frequent values greater than 400 ug/m^3 and periodic values greater than 1,000 ug/m^3 throughout the course of normal OWB operating conditions and at distances ranging from 50 feet to 150 feet from the OWB. The nephelometer readings indicate 15-second samples (NESCAUM 2006e). The reference background values recorded during the evaluation averaged <20 ug/m^3 (Johnson, 2006).

The NAAQS for $PM_{2.5}$ is 65 ug/m^3 for a 24-hour average (98^{th} percentile) and 15 ug/m^3 on an annual basis, with a proposal to lower the 24-hour standard to 35 ug/m^3. While monitoring methods and sampling times do not allow direct comparison to the NAAQS for $PM_{2.5}$, the results show that the relatively high emissions combined with relatively low stack heights result in significant air quality impacts close to the OWBs relative to background concentrations.

Modeling of an OWB by the Michigan Department of Environmental Quality was conducted to predict the potential for ambient air impacts (NESCAUM 2006f). The results predicted 1-hour average ambient air impacts exceeding twice the NAAQS for $PM_{2.5}$ extending about 50 feet from the stack with concentrations at approximately 61% of NAAQS for $PM_{2.5}$ extending out approximately 200 feet from the stack. This illustrates the problem these units pose to the OWB owner and abutters.

The NESCAUM Report indicates that $PM_{2.5}$ is released in higher concentrations from OWBs than conventional wood stoves. $PM_{2.5}$ can cause asthma, other respiratory attacks, or heart trouble. An assessment of six-hour (acute) exposure to $PM_{2.5}$ that infiltrates houses within 1000 feet of the OWB has been conducted (Boissevain, Brown & Callahan, (in press)). The assessment indicates that persons could suffer respiratory or cardiac distress if they live within 500 to 1000 feet of an OWB emitting more than 100 grams of $PM_{2.5}$ per hour during periods of low wind speeds or inversions. An OWB emitting more than 250 grams of $PM_{2.5}$ per hour could cause impacts requiring hospitalization.

A Washington State Department of Ecology (1997b) publication on the health effects of wood smoke makes several correlations that effectively illustrate the concern and the gravity of allowing unregulated operation of OWBs.

- EPA, applying statistical methods and "using daily death records in London as well as U.S. cities where daily particulate measurements were available", found a 6% increase in deaths for each 100 ug of total PM.
- EPA also found "for every 100 micrograms of total particulate matter per cubic meter of air, the risk of dying goes up 32% from emphysema, 19% from bronchitis and asthma, 12% from pneumonia, and 9% from cardiovascular disease.."

Recent studies on exposure times and health impacts establish a link between much shorter exposure times and doses than previously understood. Johnson (2006) evaluated health impacts in urban areas and found associations with exposure durations of as low as 1-12 hours and "acute cardiovascular and respiratory events, including myocardial infarction in older adults and asthma symptoms in children." The Johnson study also specifically assessed particulate matter emissions from OWBs finding peak 15-second values as high as 8,000 ug/m^3 $PM_{2.5}$, a 2.6 hr mean of 235 ug/m^3 $PM_{2.5}$ with the damper open and a 1.7 hr mean of 113 ug/m^3 $PM_{2.5}$ with the damper closed. Considering the potential for year-round operation and ability of wood smoke PM to penetrate buildings, homeowners and abutters may suffer significant exposures to wood smoke PM and other toxins.

The NESCAUM Report also indicates that the group of compounds called Polycyclic Organic Matter (POM), also known as Polycyclic Aromatic Hydrocarbons (PAHs), is released in higher concentrations from Outdoor Wood Boilers than conventional wood stoves. Likewise, $PM_{2.5}$ is released in higher concentrations, and much of the $PM_{2.5}$ is composed of POMs. Many POMs cause cancer. A screening assessment of potential carcinogenic risks from exposure to POM from OWBs found that the increased cancer risk to an individual living within 100 feet of an OWB is approximately 400 to 3,000 in a million (Held, 2006). A more formal risk assessment concluded that increased cancer risk from long-term exposure by persons living within 500 to 1000 feet of the OWB ranges from 76 to 2,700 in a million (Boissevain, Brown & Callahan, (in press)). Both risk assessments were done in accordance with standard EPA Risk Assessment Protocols for air toxics[1]. Due to lack of emissions data, neither assessment considered the added carcinogenic impacts of benzene, formaldehyde or dioxins which are

[1] The formal Boissevain, Brown & Callahan risk assessment was done using the protocols in NRC (National Research Council). 1983. Risk Assessment in the Federal Government Managing the Process. Committee on the Institutional Means for Assessment of Risks to Public Health. National Academy Press, Washington, DC, USA; and USEPA. 1989. Risk Assessment Guidance for Superfund. EPA/540/1-89/002. Office of Solid Waste, Washington, DC, USA. The screening Held risk assessment was done using the protocols in USEPA 2006, Air Toxics Risk Assessment Reference Library, Volumes 1-3, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina, USA.

also emitted from OWBs and will increase the likelihood of increase cancer incidents for exposed individuals. None-the-less, both assessments indicate that OWB may increase cancer risks well above EPA's "acceptable" level of between 1 and 100 in a million.

Additionally, complaints from abutters and observations by Maine DEP staff suggest OWBs may be routinely used for combusting residential solid waste. HAP emissions from combusting solid waste in an OWB is considered comparable to other backyard burning options. Maine DEP banned the use of burn barrels as of September 21, 2001 recognizing the health impacts resulting from this practice.

Federal, State, and Local Regulation of OWBs

What regulations apply at the federal level?

OWBs are not regulated by the EPA at this time. Federal regulations limiting fireplace and woodstove emissions were promulgated in 1988 and revised in 1995. The regulations, 40 CFR Part 60 Subpart AAA, establishes a certification program for woodstoves and fireplace inserts and requires manufacturers to demonstrate compliance with particulate emission standards of 4.1g/hr for catalytic stoves and 7.5 g/hr for noncatalytic stoves. OWBs, being relatively new at the time the legislation was enacted, are not covered by this rule.

What regulations apply at the state level?

Initiated mainly by nuisance complaints and later by emissions and health data, several states have begun to regulate OWBs with varying results. Regulation ranges from outright bans on OWBs to public awareness/outreach.

Vermont, Connecticut, Michigan, Colorado, New Hampshire, and Washington State regulate OWBs. Connecticut Law PA05-227 establishes requirements for setbacks, stack height, fuel restrictions, and specifically provides for local control of OWB installations (Connecticut Department of Environmental Protection, 2005b). Vermont regulates OWBs in a manner similar to Connecticut with the addition of notification requirements by the vendor at the time of sale. These requirements explicitly discuss proper installation and terrain criteria and must be signed by both the vendor and buyer. Vermont also proposes a particulate emission standard of 0.2 grains/dscf. The State of Washington rules are more extensive than those adopted by the New England states. In addition to the general siting, stack height, and fuel-type restrictions, Washington requires a vendor certification prior to the sale of OWBs in Washington State confirming compliance with emission standards of 2.5 g/hr PM for catalytic devices and 4.5 g/hr PM for noncatalytic devices (WAC 173-433-100(3)). New York regulates OWBs indirectly through general nuisance rules (6 NYCCR§211.2) and opacity rules (6 NYCC § 200-1.3).

In Maine, there is no specific rule or law directed at OWBs however the units may be regulated as combustion devices in commercial applications depending on the Btu rating of the OWB. Maine Rule

06-096 Chapter 101 establishes a statewide visible emissions standard of 30% opacity on a six-minute block average not to exceed two six minute periods in any three-hour period. This requires units placed in service, whether commercial or residential, to meet existing opacity standards. All owners must comply with Maine's prohibition on burning of solid waste (household trash and other residential waste).

What regulations apply at the local level?

According to New York Attorney General Elliot Spitzer, five NY counties regulate OWBs through fuel specifications, setback limitations, stack height requirements, and limits on seasonal operation while eleven other counties ban OWBs. The Wisconsin Department of Natural Resources (2004) developed a model ordinance on OWBs to offer consistency within the state recognizing that county and municipal governments were actively looking to regulate and or ban these units. The model ordinance provides guidance on several approaches to regulation such as an outright ban or in the absence of a ban, setback requirements, stack height requirements, annual permitting, and penalty provisions.

In Maine, the Town of Millinocket recently passed an OWB ordinance under Code Chapter 86. This ordinance establishes a local registration/permit program, fuel restrictions, setback requirements, stack height limitations, seasonal operating restrictions, and penalty provisions.

Committee Recommendations

ATAC believes that OWBs pose a significant health threat to citizens of Maine in areas where they have little ability to reduce exposure - their neighborhoods and homes. The relative emission loads produced by these units is excessive and is recognized by many of the Northeast states as a significant source of air pollution. Should the price of oil continue to climb, the sales of these units may expand exponentially creating a significant increase in emissions from wood burning with health impacts directly within residential areas. Until recently, improving the emission characteristics of these units and ensuring homeowners properly install OWBs in compliance with good operating practices did not appear to be a priority for most manufacturers. It should be noted however that a new manufacturer operating in Maine has designed an OWB capable of meeting or exceeding EPA's emission standard for residential wood heaters. Clean Woods Heat, LLC of East Millinocket, Maine has designed an advanced OWB and plans to have them available by late this year. Test results of the Clean Woods Heat, LLC "Black Bear" OWB using the ASTM test method demonstrated that the Black Bear could achieve an emission rate of 1.47 g/kg as a heating season weighted average compared with an emission rate of 18.5 g/kg from a conventional wood stove and 6 g/kg for an EPA certified non-catalytic stove (6.2 g/kg for EPA certified catalytic stove). Advanced boilers are also reportedly available through Maine Energyworks of Liberty, ME and New Horizon although there is no hard data to confirm emissions from these units. However,

this clearly shows that OWB technology is capable of significant emission reductions and that EPA's residential wood heater standard is a reasonable and achievable emission target.

ATAC recommends that the Maine DEP and legislature take the following action concerning OWBs:

- Develop a PSA discussing best operating practices for wood burning devices, the health effects of wood smoke, and reiteration of the prohibition on backyard burning (residential solid waste combustion).
- Enact a moratorium on the sale of OWBs until these units are regulated at the same level as woodstoves and fireplaces under 40 CFR Part 60 Subpart AAA - *Standards of Performance for New Residential Wood Heaters* or a manufacturer demonstrates to the satisfaction of the Maine Department of Environmental Protection, the ability to meet or exceed particulate standards established under 40 CFR 60 Subpart AAA.
- In the absence of federal legislation or a moratorium, adopt state rules on an expedited basis to regulate outdoor wood boilers and apply current federal or more stringent state-level emission standards. See Attachment A for general regulatory provisions.
- Require OWB manufacturers/suppliers to create an Installation & Operation (I&O) document highlighting proper operating and installation requirements consistent with state OWB regulations. Require all vendors and buyers to sign the document at the time of sale. Require the vendor and buyer to provide a copy of the I&O document to the Department and require buyers to retain a copy of the I&O agreement. Prohibit the sale of new or existing OWBs, regardless of retail or private sale, without an I&O agreement.
- Require OWB manufacturers or suppliers to demonstrate compliance with state visible emission and particulate standards for any new OWB sold in Maine for residential use within three months of the date of adoption.
- Require OWB manufacturers/suppliers to demonstrate compliance with state visible emission and particulate standards for any new OWB sold in Maine for commercial use within three months of the date of adoption.
- Coordinate with local and county governments/agencies to actively identify improper installations, i.e., those that do not conform to recommended installation criteria (setback, stack height, fuel restrictions) published by each manufacturer/vendor or applicable state rules for all existing OWBs in Maine.
- Adopt rules to address existing OWBs to include minimum requirement that units comply with all written installation and operating instructions available to the buyer at the time of

sale or minimum state standards addressing setback, stack height, opacity, and fuel restrictions.

- Establish a date, not to exceed three (3) months from the date of adoption, by which all OWBs in Maine must comply with these standards.

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Attachment A

Proposed General Rules Governing OWBs

1. **Purpose**. This chapter establishes emission standards, opacity standards, and fuel restrictions for outdoor wood-fired boilers.

2. **Applicability**. The provisions of this chapter apply to outdoor wood-fired boilers in all areas of the State of Maine. This chapter shall not apply to residential wood heaters regulated and certified under 40 CFR 60 Subpart AAA-Standards of Performance for New Residential Wood Heaters or other combustion devices regulated or licensed under 06-096 Chapters 101, 103, 115, or 140. To the extent future State and Federal regulations specifically address OWBs, the more stringent regulation shall apply.

3. **Definitions**. Unless a different meaning is clearly required by context, the following words and phrases as used in this chapter, shall have the following meanings:

   (A) "EPA" means Environmental Protection Agency.

   (B) "Existing outdoor wood-fired boiler or furnace" means an outdoor wood-fired boiler or furnace manufactured and sold, bartered, or given away, prior to the effective date of this chapter.

   (C) "Department" means Maine Department of Environmental Protection.

   (D) "New outdoor wood-fired boiler or furnace" means an outdoor wood-fired boiler or furnace manufactured after the effective date of this chapter. Any existing outdoor wood-fired boiler or furnace sold, bartered, or given away after the effective date of this chapter shall be a "new outdoor wood-fired boiler or furnace.

   (E) "Nuisance" means any odor, emission, or event that prevents the use and enjoyment of one's property. For purposes of this chapter, an OWB shall constitute a nuisance following three or more verified complaints within any one-month period.

   (F) "Outdoor wood-fired boiler (OWB)" (same as outdoor wood-fired furnace) means an accessory structure or appliance capable of being installed out of doors and designed to transfer or provide heat, via liquid or other means, through the burning of wood or any other nongaseous or non-liquid fuels for heating spaces other than where such structure or appliance is located, any other structure or appliance on the premises, or for heating domestic, swimming pool, hot tub or Jacuzzi water. "Outdoor wood-burning boiler or furnace" does not include a fire pit, wood-fired barbecue, or chiminea.

   (G) "Seasoned wood" means wood of any species that has been sufficiently dried so as to contain twenty percent or less moisture by weight.

   (H) "Treated wood" means wood of any species that has been chemically impregnated, painted, or similarly modified to prevent weathering or deterioration.

4. **Prohibition**. No person shall, from the effective date of this chapter to the effective date of regulations promulgated by the United States Environmental Protection Agency to regulate

OWBs, if more stringent, construct, install, establish, modify, operate or use an existing or new outdoor wood-fired boiler or furnace, without meeting the applicable requirements of this chapter.

5. **Emission and Performance Standards**.

(A) Existing OWBs. No person may sell, bargain, give away, operate, modify, or use an existing OWB unless the OWB complies with the following:

(i) Installation of the OWB is not less than two hundred feet from the nearest residence not serviced by the OWB, however in no event shall an existing OWB be located within 1,000 feet of a state licensed school, daycare, or healthcare facility; and

(ii) Installation of the chimney of the OWB is at a height that is five feet more than the height of the highest roof peak of any occupied building that is located within 500 feet of the OWB, provided the chimney height is not more than fifty-five feet or is otherwise limited by local ordinances or fire codes adopted prior to the effective date of this chapter; or

(iii) Installation and operation of the OWB is in full compliance with the manufacturer's written installation and operating instructions (instructions), provided such instructions were available at the time of sale/distribution, the issue date of the instructions coincides with the manufacture date or earlier and specifically address setback distances and chimney height. The provisions of this subsection (5(A)(iii)) do not apply for instructions that are revised or otherwise amended after the date of manufacture and before the effective date of this chapter to the extent such revisions are less stringent than the provisions of subsections 5(A)(i-ii).

(iv) No other materials are burned in the OWB other than seasoned wood that is not treated wood.

(v) An existing OWB sold, bartered for, or given away after the effective date of this chapter shall constitute a new OWB.

(vi) Any existing outdoor wood-fired boiler or furnace installed prior to the effective date of this chapter shall meet the stack height, and setback requirements established by this chapter within one year. Any existing OWB that does not meet the requirements of section 5(A)(i-iii) during this period may not operate between April 15 and September 15 and must permanently discontinue operation if compliance is not achieved within the one year period .

(B) New OWBs. No person may advertise, operate, sell, bargain for, give away, modify, install, or use a new OWB unless the new OWB complies with the following emission limits and has received a certificate from the Department:

(i) Particulate emission limits;

(a) for catalytic units 4.1 g/hr

(b) for noncatalytic units 7.5 g/hr

(c) Emission Test Methods and Procedures. Particulate emission limits shall be determined as follows:

(1) In order to obtain certification of an outdoor wood-fired boiler under subsection 5(B) of this section, the manufacturer of any such boiler shall have an emission test(s) conducted to determine compliance with the particulate matter emission limit under subsection 5(B)(i) of this section and furnish the Department with a written report of the results of such tests, including a detailed description of the operating conditions of the boiler during the tests. Said written report shall contain such documentation and other information and follow such format as may be specified by the Department. At the discretion of the Department, a manufacturer of an OWB subject to this section may have emission testing conducted on a representative boiler within a model line of OWBs and may use those tests to demonstrate compliance of all units manufactured in that model line to the extent units are mechanically and operationally equivalent as demonstrated by the manufacturer and approved by the Department.

(2) An independent testing consultant, who has no conflict of interest and receives no financial benefit from the outcome of the testing, other than for services rendered, shall conduct all emission testing required under this section. Manufacturers of outdoor wood-fired boilers shall not involve themselves in the conduct of any emission testing under this section nor in the operation of the unit being tested, once actual sampling has begun.

(3) Emission tests shall be conducted and data reduced in accordance with 40 CFR Part 60, Appendix A, Test Methods 1 through 5, and 40 CFR Part 51, Appendix M, Test Method 202, or alternative methods approved by the Department. All tests shall be conducted in accordance with Maine's Emission Testing Guidelines, as amended and under a test protocol, which has received the prior approval of the Department. Emission tests shall be conducted under such conditions as the Department may specify, based on representative performance of the OWB under actual field operating conditions.

(4) The manufacturer of the OWB shall provide the Department with at least 30 days prior notice of any emission test to afford the Department the opportunity to have an observer present. The manufacturer of an OWB(s) being tested as required by this section shall reimburse the State of Maine or it's designated representative for reasonable expenses incurred by any such Agency observer for out-of-state travel to observe such testing, including among other items the costs of transportation, lodging and meals.

(C) Opacity limits;

(i) No person shall cause or allow emission of a smoke plume from any new OWB to exceed thirty (30) percent opacity on a six minute block average except for no more than two (2) six minute block averages in any three (3) hour period.

(ii) Test method and procedures. Methods and procedures specified by the EPA in "40 CFR 60 Appendix A reference method 9 – *Visual Determination of the Opacity of Emissions from Stationary Sources"* as amended through July 1, 1990, shall be used to determine compliance with subsection 5(C)(i) of this section.

(iii) Enforcement. Smoke visible from a chimney, flue, or exhaust duct in excess of the opacity standard shall constitute prima facie evidence of unlawful operation of an applicable OWB. This presumption may be refuted by demonstration that smoke was not caused by an applicable OWB. The provisions of this requirement shall:

(1) Be enforceable on a complaint basis.

(2) Not apply during the starting of a new fire for a period not to exceed ten minutes in any eight-hour period.

(D) Notification by Manufacturers

(1) By March 1st of each year and prior to the sale of any new OWB as necessary when an OWB is certified, whichever is sooner, each OWB manufacturer shall provide the following information in writing to any person requesting such information or any person to whom the manufacturer has distributed or sold, intends to distribute or sell, or actually distributes or sells OWBs in Maine or for installation in Maine:

(a) A list of all the models of OWBs it manufactures; and

(b) An identification of which, if any, of said models or boilers has received a certification of compliance under subsection 5(B) of this section and thus may be distributed or sold in Maine or for installation in Maine.

(2) By March 15th of each year, a copy of all written information provided to comply with paragraph (1) of this subsection and a list of persons to whom it was provided shall be submitted to the Department.

6. **Siting Standards**.

(A) Installation of any new OWB may not be less than 200 hundred feet from the nearest property line, however in no event shall a new OWB be located within 1,000 feet of a state licensed school, daycare, or healthcare facility; and

(B) Installation of the chimney of any new OWB is at a height that is five feet more than the height of the highest roof peak of any occupied building that is located within 500 hundred feet of the OWB . Chimney height shall be limited to the lesser of fifty-five feet or a height otherwise limited by local ordinances or fire codes adopted prior to the effective date of this chapter; and,

(C) The installation complies with all manufactures' written installation and operating instructions to the extent instructions are more stringent than the provisions of this subsection 6(A&B).

(D) Existing OWB Low-income Exemption. Existing OWBs installed and operated at a single-family low-income residence may petition the Department for an exemption from the requirements of section 5(A)(i-iii). The Department may grant an exemption based upon evaluation of specific homeowner circumstances. Such exemption, if granted, shall be valid until such time as the OWB becomes a new OWB or funding assistance becomes available to bring the unit into compliance with these provisions.

7. **Notice to Buyers**. Each manufacturer and distributor shall be jointly and severally responsible for obtaining a written agreement signed by the distributor and buyer at the point of sale acknowledging the installation and operation requirements of this Chapter for all new OWBs.

(A) Each [manufacture / distributor] prior to offering an OWB for sale, shall provide certification as issued by the Department, that each model offered for sale in the State of Maine complies with the emission and opacity limits of this chapter.

(B) Any transaction for sale, barter, or donation of an existing OWB shall be accompanied by installation and operating documentation containing information listed in section 5(B) & 5(C).

8. **Delegation of Authority**. The provisions of this chapter shall be enforced by the Department and may be enforced by any municipality affected by the operation or potential operation of an OWB, however the Department shall retain the following sections.

(A) Section 5(B)(i)(c)

(B) Section 5(D)

(C) Section 7

9. **Violations**.

(A) Any person who operates an OWB in violation of this chapter shall be deemed to have committed a violation. Each day of operation of such OWB in violation of this chapter shall be a separate violation. Violations are enforceable in accordance with the

Department's general enforcement authority found at 38 MRSA §347, and subject to fines as set forth in 38 MRSA §349.

(B) No person shall cause or permit the emission of any air contaminant from an identifiable OWB, including any air contaminant whose emission is not otherwise prohibited by this chapter, if the air contaminant emission causes detriment to the health, safety, or welfare of a person, plant, or animal, or causes damage to property or business, or constitutes a nuisance.

(C) Failure to correct any violation or mitigate a nuisance within thirty days, incurring three or more violations within any six-month period, or an OWB deemed a nuisance more than three times in any consecutive six-month period, may result in an order to permanently discontinue operation of any new or existing OWB.

10. **Enforceability**. Nothing contained herein shall authorize or allow burning which is prohibited by codes, laws, rules or regulations promulgated by the United States Environmental Protection Agency, Maine Department of Environmental Protection, or any other federal, state, county, local agency, or municipality. OWBs, and any electrical, plumbing or other apparatus or device used in connection with an OWB, shall be installed, operated, and maintained in conformity with the manufacturer's specifications and any and all local, State and Federal codes, laws, rules and regulations. In case of a conflict between any provision of this chapter and any Federal, State or local ordinances, codes, laws, rules or regulations, the more restrictive or stringent provision or requirement shall prevail.

11. **Severability**. The invalidity of any clause, sentence, paragraph or provision of this rule shall not invalidate any other clause, sentence, paragraph, or part thereof.