AN ORDINANCE FOR ZONING FOR SOLID FUEL-FIRED HEATING DEVICES (SFHDs)

ADD I. IF YOUR COMMUNITY HAS, WILL ALLOW, PROHIBITS, OR WILL PROHIBIT SFHDs:

I. ADMINISTRATIVE PROVISIONS

A. PURPOSE. Model Community adopts the regulations in this ordinance controlling the use, installation and operation of outdoor wood or other solid fuel-fired heating devices (SFHDs) to achieve the following purposes:

1. **Health.** To protect citizens from environmental hazards and to safeguard community health. In particular, to protect the health of citizens from fine particles in emissions generated by SFHDs. The Clean Air Act (CAA) required the U.S. Environmental Protection Agency (EPA) to establish standards for particulate matter. EPA's daily and annual fine particle National Ambient Air Quality Standards (NAAQS) were developed to protect the public from adverse health effects associated with exposure to fine particle pollution exposure. Sensitive populations protected by the CAA include persons who already have heart or lung diseases, children, and older adults. They experience serious health effects such as heart attacks, strokes, acute and chronic bronchitis, asthma episodes, reduced lung function, and other respiratory illnesses as a result of inhaling fine particle smoke which imbeds in their respiratory and circulatory systems. In addition to health effects, scientific studies show inhalation results in increased hospital and emergency room visits, lost work and school days, and in rare cases, premature death.
2. **Fire safety.** To protect citizens and structures from fire safety risks from SFHDs that are not properly installed, do not have proper safety equipment such as spark arresters, or are installed in close proximity to other buildings.
3. **Welfare.** To ensure the welfare of citizens and value of neighboring property are protected from negative effects of SFHDs.
4. **Education.** To educate citizens about the proper use, installation and operation of SFHDs and assist property owners and managers in maintaining compliance with these regulations.

B. STATUTORY AUTHORITY. Model Community has the legal authority to adopt planning and zoning regulations. This legal authority exists in common law and in statute as listed below:

1. **All cities and towns.** Minn. Stat. §§ 462.351 through 462.365 (planning and zoning authority).
2. **Counties.** Minn. Stat. §§ 394.21 through 394.37 (planning and zoning authority).

C. DEFINITIONS. For this ordinance, words not defined have the main meaning found at http://www.m-w.com. These words and phrases are defined as listed here:

1. **Accessory structure.** A structure on the property designed to serve a main residence but also including a garage, housing for animals, or other supplementary land use structure which may use heat from an SFHD if it is not the SFHD.
2. **Clean wood.** Wood that has no paint, stains, varnish, or other types of coatings; that has not been pressure treated with preservatives, including but not limited to, copper chromium arsenate, creosote, or pentachlorophenol; that does not contain laminate, glue, or bonding agents; or is not co-burned with any prohibited fuels listed in **Section I.C.19**.
3. **Code official.** The officer or other designated authority charged with the administration and enforcement of this code or a duly authorized representative.
4. **Dual-fuel.** An SFHD which is designed by a manufacturer to burn another fuel in addition to wood.
5. **EPA.** The U.S. Environmental Protection Agency.
6. **Existing SFHD.** An SFHD that is installed and has been operating at its current location within Model Community within the year prior to the effective date of this ordinance.
7. **Heating degree day season.** The time period during which the outdoor ambient temperature on an average daily basis falls below 65 degrees Fahrenheit.
8. **LGUs**. Local governmental units, including townships, cities, and counties, depending on which has jurisdiction under state law, but not including unorganized territory under county control.
9. **Manufactured.** Built and operational, and subsequently ready for shipment whether packaged or not.
10. **Manufacturer.** Any person who constructs or imports into the United States an SFHD.
11. **New SFHD.** An SFHD installed after the effective date of this ordinance.
12. **NSPS.** EPA's Standards of Performance for New Residential Hydronic Heaters and Forced-Air Furnaces, published in the Federal Register March 16, 2015 (http://www.gpo.gov/fdsys/search/citation.result.FR.action?federalRegister.volume=2015&federalRegister.page=13715&publication=FR) and codified at 40 CFR 60 Subpart QQQQ.
13. **Nuisance.** The creation of a public health, safety, fire, or private danger or interference by constructing or installing an unsafe structure potentially injurious to human, plant or animal life or to property, or that unreasonably interferes with the comfortable enjoyment of life and use of private or public property.
14. **PM.** Particulate matter.
15. **Particulate matter.** Total particulate matter including coarse PM10 or larger and fine PM2.5, as defined in https://www.revisor.mn.gov/rules/?id=7005.0100.
16. **Pellets.** Refined and densified wood shaped into small pellets or briquettes that are uniform in size, shape, moisture, density and energy content.
17. **Permit.** An official document or certificate issued by Model Community which authorizes performance of a specified activity under specified conditions.
18. **Person.** An individual, partnership, corporation, company, or other association.

19. **Prohibited fuels.** Animal carcasses; asphalt products; coal; chemicals; composition board; construction and demolition debris; food wastes; furniture; garbage; glossy or colored papers; hazardous solid waste; industrial solid waste; lawn clippings, yard waste or other vegetative matter; manure; materials containing plastic; materials containing synthetic or natural rubber; newsprint; packaging; paints and paint thinners; particleboard; plywood; sheetrock; tires; waste petroleum products; wiring; wood products that are painted, varnished, or treated with preservatives, and any wood that does not fit the definition of clean wood.
20. **Rain cap.** A protective cover installed at the top of a chimney stack for the purpose of preventing rain from entering the stack. A spark arrester with a solid cap that is capable of slowing the exit velocity of combustion byproducts is a rain cap.
21. **Setback.** The distance measured from a property boundary or structure to the nearest edge of the center of the SFHD or to the nearest edge of a structure housing an SFHD.
22. **SFHD.** A Solid Fuel-Fired Heating Device, also known as a solid fuel-fired heating appliance.
23. **Solid.** A material that has a melting point, decomposes, or sublimes at a temperature greater than 68° Fahrenheit (20° Celsius).
24. **Solid Fuel-Fired Heating Device (SFHD).** A solid fuel-burning device manufactured or used to burn wood and designed to create heat on a continual basis, by sending heat through water, antifreeze or steam into interconnected piping. An SFHD may also be called by other names, such as: outdoor wood furnace; outdoor wood boiler; outdoor wood burner; closed combustion solid-fuel-burning appliance; accessory boiler; alternative fuel-burning device; or outdoor wood-fired hydronic heater.
25. **Spark arrester.** Any device which prevents the emission of flammable debris from SFHDs, fireplaces, and wood burning stoves.

D. PERSONS AND EQUIPMENT COVERED BY THIS ORDINANCE.

1. **Persons covered.** Any person who installs, operates, or owns an outdoor SFHD must comply with the provisions in this ordinance.
2. **Types of fuels used by SFHDs covered in this ordinance.** The provisions of this ordinance apply to SFHDs that are manufactured or used to burn any of the following:
   - **a.** Wood;
   - **b.** Wood pellets; or
   - **c.** Wood and another fuel (a dual-fuel SFHD).
3. **SFHD equipment covered.** The provisions of this ordinance apply to all outdoor SFHDs, whether a primary, supplemental, residential, or commercial/industrial heat source, which include the following components:
   - **a.** SFHDs and their piping, chimney stacks, flues, and/or fans; and
   - **b.** Any other equipment, device, appliance or apparatus, or parts thereof, which are intended to be used as part of an SFHD.
4. **Surrounding structure covered.** Any accessory structure designed to surround the SFHD must meet the provisions of this ordinance. Accessory structures are also regulated by Model Community's zoning and subdivision ordinances.

E. EQUIPMENT AND ACTIVITIES NOT COVERED BY THIS ORDINANCE. This ordinance does not apply to:

1. **Outdoor grills.** Outdoor devices, equipment, appliance and/or apparatus used to grill or cook food using charcoal, wood, propane, or natural gas;
2. **Fireplaces.** Natural gas-fired fireplaces or traditional wood-burning fireplaces in the interior of a residential dwelling;
3. **Non-SFHD heaters.** Indoor heating devices which are not SFHDs, such as wood stoves;
4. **Liquid fuel devices.** Industrial gas or liquid petroleum fuel devices used on site of temporary construction, demolition, or maintenance activities;
5. **Recreational fires.** Recreational fires within the limits set by the Minnesota State Fire Code (Minn. R. 7511.0307) and campfires as defined in Minn. Stat. Chapter 88.01 Subp. 25 (https://www.revisor.mn.gov/statutes/?id=88.01);
6. **Fire training and open burning sites.** Fire training or permanent tree and brush open burning sites permitted under Minn. Stat. Chapter 88.17 Subp. 3 (https://www.revisor.mn.gov/statutes/?id=88.17);
7. **Forced air furnaces.** Forced air furnaces designed to burn fuel that warms spaces other than the space where the furnace is located, by the distribution of air heated by the furnace through ducts; and
8. **Masonry heaters.** Masonry heaters, either site built or factory built devices, in which the heat from intermittent fires burned rapidly in the firebox is stored in the refractory mass for slow release to building spaces. Masonry heaters typically have a firebox and heat exchange channels built from refractory components, through which flue gases are routed.

F. EFFECT OF A COURT HOLDING.

1. **Severability.** If a court holds that any portion of this ordinance is unconstitutional, inoperative or void, that holding will not affect the remaining portions of this ordinance.
2. **Applicability.** If a court holds that any portion of this ordinance does not apply to any person, group of persons, property or kind of property, or circumstances or set of circumstances, that holding will not affect the application of this ordinance to any other person, property or circumstance.
3. **Intent remains.** The intent of Model Community in adopting this ordinance will remain in effect for all portions and all circumstances of this ordinance not affected by a court holding.

G. INCORPORATION OF DOCUMENTS BY REFERENCE. This ordinance sometimes references emissions standards, emission levels, or requirements in other documents or other laws created and maintained by other entities. When referenced in this ordinance, the requirements in the referenced document or law will become a requirement of this ordinance (as provided for cities and towns under Minn. Stat. § 471.62). The referenced document or law may be revised in the future by the entity that created and maintains the document or law. Any such revisions will also become a requirement of this ordinance.

ADD II. IF YOUR COMMUNITY HAS AN EXISTING SFHD:

II. EXISTING SFHDs TO BECOME NONCONFORMING

A. EXISTING MODELS WHICH DO NOT MEET THE NSPS. Because of their higher emissions, any existing SFHD model which EPA has not approved as meeting the NSPS, is classified as a legal nonconforming land use. Any existing SFHD which is a model EPA has approved as complying with Step 1 requirements of the NSPS retains its conformance status until May 15, 2020. Unless this SFHD model also meets the Step 2 requirements of the NSPS, its status shifts to legal nonconforming land uses on May 15, 2020.

B. REMOVAL WHEN USEFUL LIFE ELAPSES. When the use of a nonconforming existing SFHD is discontinued for a period of more than one year, it must be immediately removed from the property by the property owner and not installed elsewhere in the Model Community.

C. REMOVAL AFTER DESTRUCTION BY FIRE OR OTHER PERIL. If any nonconforming existing SFHD is destroyed by fire or other peril to the extent of greater than 50% of its market value, and no building permit has been applied for within 180 days of when the property is damaged, the SFHD may only be replaced by a conforming SFHD.

D. NO EXTENSION, ENLARGEMENT, OR EXPANSION. No existing legal nonconforming SFHD shall be extended, enlarged, or expanded after the date of effectiveness of this ordinance.

E. RELOCATION PROHIBITED. An existing legal nonconforming SFHD shall not be relocated to another parcel in Model Community if that parcel has a different property description than the site on which the nonconforming SFHD was located on the effective date of this ordinance.

ADD III., IV., AND V. IF YOUR COMMUNITY WILL ALLOW NEW SFHDs:

III. REQUIREMENTS FOR NEW SFHDs

New SFHDs must meet all of the following requirements:

A. NSPS. New SFHDs must meet the NSPS requirements for certification, installation, operation, and maintenance.

B. MINNESOTA CODES. New SFHDs must meet the most restrictive of applicable chimney stack height and design, and setback requirement found in the state of Minnesota Building, Mechanical, or Fire Code.

C. SETBACK AND CHIMNEY STACK HEIGHT. New SFHDs, when installed, must meet the following requirements:

1. The chimney stack must not have a rain cap installed.
2. The minimum exit height of the chimney stack must be at least 10 feet from the ground.
3. The minimum setback of the SFHD from the nearest property line must be 100 feet.

IV. INTERIM USE ZONING PERMIT REQUIRED FOR NEW SFHDs

An interim use zoning permit or certificate is required from the Model Community before the start of construction and installation of a new SFHD. Model Community may combine this interim use zoning permit with a building or operational permit, or certificate, on forms provided by the Model Community. Failure to submit an application for the permit is a violation of this ordinance. Violation of the permit terms is grounds for Model Community to terminate the permit and take additional enforcement actions.

A. PURPOSE OF PERMIT FOR NEW SFHDs. The purpose of the interim use permit/certificate is to ensure that setback locations, chimney stack heights, and storage of fuel for a new SFHD meet all requirements of Model Community's ordinance and new SFHDs meet federal equipment performance regulations. Requirements for the permit application are listed in **Section V.**

B. REQUIREMENTS OF ZONING DISTRICT. This permit must contain a condition that the SFHD be operated in a manner in compliance with requirements of the zoning district in which it operates, and within the requirements of **Section II.**

C. LIMITATIONS ON ZONING DISTRICTS IN WHICH NEW OUTDOOR SFHDs CAN BE INSTALLED. New outdoor SFHDs are accessory structures which are interim permitted uses only in agricultural and industrial zoning districts. They are explicitly prohibited in residential districts and within a half mile of congregate care homes, lands dedicated to public or institutional uses, and medical facilities.

D. PERMIT APPLICATION FEE REQUIREMENTS. The initial application must be submitted by the owner of the land on which the SFHD is proposed with an application fee at the same time. The amount of the application fee must be determined by Model Community and may change periodically.

V. MINIMUM APPLICATION INFORMATION FOR NEW SFHDs

Prior to the start of building or installation of a new SFHD, a zoning permit/certificate application must be submitted to Model Community on a form provided by it, containing the information requested directly below. The Model Community shall review the information and issue a preliminary decision within the time limits set forth in https://www.revisor.mn.gov/statutes/?id=15.99. Failure to obtain the permit and build, install, or operate without an issued permit, is a violation of this code. The information required is:

A. Contact information. Name, address, and phone number of property owner;

B. Legal description. A legal description of the property prepared by a registered land surveyor or from the county property tax bill;

C. Site plan. A site plan or survey illustrating the dimensions of the property, including:

1. **Location and identification of buildings on the site.** Location and identification of buildings on the site on which the SFHD will be located;
2. **Location and identification of adjacent buildings.** Location and identification of buildings and the nearest residences on adjacent properties;
3. **Location of the SFHD.** Location of the SFHD sufficient to establish exterior boundaries of the SFHD unit or any enclosing accessory structure required by the Model Community code/ordinance for SFHDs;
4. **Fuel storage areas.** Fuel storage areas relative to the lot lines and distances from neighboring residences on adjacent properties;
5. **Information on manufacturer and specifications.** SFHD manufacturer, model number, date manufactured, specifications for installation, operation, and maintenance, and enough information to determine whether the SFHD meets the specifications.
6. **Modifications.** Description of any modifications to the SFHD since date of manufacture;
7. **Chimney construction.** Chimney stack materials and height;
8. **Building and fire code compliance.** Evidence that the SFHD meets applicable building code and fire code requirements;
9. **Safety standard compliance.** Evidence that the SFHD meets safety standards issued by the Underwriters Laboratories (UL), American National Standards Institute (ANSI), or Canadian Standards Association (CSA) listing;

10. **Proposed dates of operation.** The proposed dates of operation, limited to dates in the heating degree day season, each year; and
11. **Other information needed by Model Community.** Other information as requested by Model Community staff.

ADD VI. IF YOUR COMMUNITY WILL PROHIBIT NEW SFHDs:

VI. NEW SFHDs PROHIBITED

For the reason detailed in Sections **I.A,** new SFHDs are prohibited in Model Community. No person shall sell or distribute, install, or operate any new SFHD in Model Community.

ADD VII. IF YOUR COMMUNITY HAS OR WILL ALLOW SFHDs:

VII. COMPLIANCE REQUIREMENTS FOR LANDOWNERS OF SFHD SITES

Any landowner on which an SFHD is located or proposed to be located must comply with all applicable laws, regulations, rules, ordinances, codes, and permit conditions of Model Community or other levels of government concerning building, construction, installation, or zoning of any SFHD.

ADD VIII. AND IX. IF YOUR COMMUNITY HAS, WILL HAVE, PROHIBITS, OR WILL PROHIBIT SFHDs:

VIII. ENFORCEMENT

A. RIGHT OF ENFORCEMENT. Model Community's code official is authorized to enforce the provisions of this ordinance, render interpretations of this code, and adopt policies, procedures, rules and regulations in order to clarify the ordinance provisions. Such interpretations, policies, rules and regulations must comply with the intent and purpose of this Code and not have the effect of waiving requirements specifically provided for in this Code. A representative of a local or community board of health may also enforce this provision according to its general authority to inspect nuisance conditions granted under Minn. Stat. § 145A.04, subd. 7 and subd. 10.

B. RIGHT OF ENTRY. The code official is authorized to enter the property on which the SFHD is located to inspect or perform the duties if the code official makes an inspection to enforce the provisions of this code, or has reasonable cause to believe that an SFHD on a premise is violating this ordinance, imposed by this code. The code official must present credentials and request entry to the property. If entry to the property is refused, the code official can

use every legal remedy to secure entry.

C. RIGHT OF INSPECTION. The Model Community's code official designated to review applications and issue permits regulated by this code, can inspect the SFHD for which the permits have been issued, to enforce compliance with the provisions of this code not already regulated by the Minnesota building, mechanical, and fire codes.

D. PROCEDURE FOR PERMIT REVOCATION. If the Model Community determines that an SFHD on a premise is violating the requirements of any individual or combined certificate or permit issued by the Model Community, Model Community can revoke the certificate or permit after a hearing is held by the governing body, upon 30 days' written notice given to the permit holder, landowner, or operator**.**

IX. PENALTIES

A. ADMINISTRATIVE PENALTY OPTION. Model Community can issue an administrative penalty order to any person who violates a provision of this ordinance. Administrative penalty procedures are informal, cost-effective, expeditious alternatives to criminal charges for violations, and often are more effective than criminal charges in zoning violations for bringing the desired results. The procedures are voluntary for persons who have been charged with violations, and the person charged can withdraw any time from participation. If the person charged does not pay the monetary penalty that Model Community imposes, Model Community can seek to collects costs of administrative penalty procedures as imposed. Model Community can also seek to collect costs of administrative penalty procedures as part of a subsequent criminal sentence, if the person is charged and if found guilty of the criminal violation. The amount payable must be determined according to the schedule adopted by resolution of the Model Community governing body periodically, and paid directly to Model Community.

B. CRIMINAL CHARGES. A landowner or operator who violates or has a permit revoked, or does not meet the requirements of Sections **II.-VII.** is guilty of a violation of this code until the cause of the violation is corrected to the satisfaction of the code official. Each day of violation is considered a separate violation of this code. The penalty for each violation shall be a misdemeanor as defined in Minn. Stat. § 609.02, subd. 3, and subject to the maximum penalty of 90 days in jail and/or a $1000 fine, plus the costs of prosecution.

C. INJUNCTIVE AND OTHER FORMS OF RELIEF. If Sections **IX.A.** or **IX.B.** do not produce a halting of the zoning violation, Model Community may seek injunctive or other forms of relief to obtain compliance with this code.

SOLID FUEL-FIRED HEATING DEVICES MODEL ORDINANCES

Supplemental Information for Section III

This appendix provides technical air quality information to support Minnesota local governmental units (LGUs) establishing and implementing ordinances for Solid Fuel-Fired Heating Devices (SFHDs). Minnesota Pollution Control Agency (MPCA) staff conducted air dispersion modeling analyses of multiple scenarios of residential SFHDs with varying combinations of stack heights and setbacks (from the property line of the nearest neighbor) using the PM2.5 National Ambient Air Quality Standards (NAAQS) as a public-health measurement or benchmark for how far a setback would be needed. The air dispersion modeling underlying the Table 1 evaluation was conducted for SFHDs.

Solid Fuel-Fired Heating Devices (SFHDs) have the potential to adversely impact air quality and the quality of life and health for nearby residents. LGUs are empowered by statute to protect residents from air quality-related environmental health hazards and public health nuisances that may occur from SFHDs (See generally, Minn. Stat. ch. 145A). The MPCA shares similar air quality goals with LGUs on a state-wide basis through the Federal Clean Air Act, and supports LGUs through technical, and, if necessary, regulatory assistance (See Minn. R. 7009.0080).

Specific MPCA technical support is provided to LGUs in the form of setback distances between SFHDs and nearest neighbors based on air quality dispersion modeling and a health-based evaluation benchmark for particulate matter less than 2.5 microns ($PM_{2.5}$). The MPCA SFHD setbacks and related air quality evaluation may provide some support in the removal and abatement of an SFHD if it is declared a public health nuisance (Minn. Stat. § 145A.04, subd. 8).

I. AIR DISPERSION MODELING STUDY

MPCA developed a technical support document describing the air dispersion modeling study used to develop the information in Table 1. Air quality dispersion modeling is a computer simulation that predicts air quality concentrations from various types of emission sources. For pollutants emitted through a chimney stack, the modeling considers the emission rate, chimney stack height, chimney stack diameter, and chimney stack gas temperature and velocity, as well as the effect of nearby buildings and terrain. Air quality dispersion models use meteorological data such as temperature, wind direction, and wind speed to calculate concentrations. Five years of National Weather Service (NWS) meteorological data is used for air quality modeling.

The modeling technical support document is available on the MPCA website. Assumptions for modeling and modeling results are contained in the technical support document.

As with any modeling analysis, there are considerations that should be kept in mind when using the information in Table 1:

A. Table 1 is not based on physical safety considerations or code.
The first column in Table 1 presents the chimney stack heights studied in MPCA's air quality modeling study. Communities may have safety concerns with some chimney stack heights; however, the analyses conducted by MPCA and the findings presented in Table 1 are strictly based on air quality, not on safety or code considerations. The chimney stack heights in the Table may exceed manufacturer recommendations or they may not comply with Minnesota Building, Mechanical, and Fire Codes.

Stack installation must be properly designed and installed in accordance with manufacturer specifications and Minnesota Building, Mechanical, and Fire Codes.

B. More extreme site conditions may require greater setbacks or chimney stack heights.
The chimney stack height and setback combinations presented in Table 1 are based on the findings from MPCA's general air dispersion modeling study of outdoor SFHDs. This is a list of factors that may be present under site-specific conditions and could result in air quality impairments.

1. Factors that can interfere with airflow and could negatively affect dispersion of the emissions:
- **a.** Using rain caps. Rain caps "slow down" the rate at which chimney stack gases leave the chimney stack. Modeling demonstrates that using a rain cap significantly interferes with the dispersion of particulate matter, and resulted in unacceptably high ambient air concentrations. Rather than establishing very high setback distances, the model ordinance bans the use of rain caps.
- **b.** Not installing, operating or maintaining the equipment according to manufacturer's instructions. The NSPS requires manufacturers to specify in the owner's manual proper wood heater installation, including location, chimney stack height and achieving proper draft. User's manuals often recommend raising the chimney stack 2 feet above nearby buildings including the neighbor's home. Adequate dispersion of pollutants requires that the chimney stack discharge at an elevation higher than nearby buildings that can block air movement.
- **c.** Locating the SFHD in areas with significant valleys, hills or bluffs (meaning the landscape is taller than the height of the chimney stack) is likely to worsen air quality compared to the results shown in Table 1;
- **d.** The nearby presence of buildings taller than 28 feet; or
- **e.** Installing the SFHD closer to a building than the 30 feet separation distance assumed in the modeling.

2. Factors that can increase emission rates:
- **a.** Poorly operating or maintained equipment.
- **b.** Burning unseasoned (wet) wood.
- **c.** Burning fuel not intended for the equipment.
- **d.** The use of homemade heaters which likely produce higher emissions.
- **e.** Using SFHDs larger than the modeled residential sizes (such as SFHDs serving commercial buildings or very large residential heat demands).
- **f.** Equipment that is over-sized for the actual heating demand.

3. **Factors that can increase the ambient air concentrations:**
   a. The presence of more than one SFHD in close proximity.

C. The setback and chimney stack height combinations from Table 1 should reduce, but it may not eliminate, the chance of nuisance conditions.

Table 1 is based on general conditions evaluated with standard air dispersion modeling methods. Various general assumptions were modeled that may not be consistent with conditions at a specific location if site-specific conditions are outside the scope of the general modeling assumptions.

The setback evaluation for Table 1 was conducted using the 24-hour and annual $PM_{2.5}$ NAAQS as the evaluation benchmark. The modeling evaluation focused on $PM_{2.5}$ because relatively more emissions data is available for PM than for other pollutants and because $PM_{2.5}$ was considered a relevant criteria air pollutant with well-documented inhalation health risks and an established regulatory value.

The recommended setback distance is based on that distance from an operating SFHD where resulting ambient air concentration from the emission of the SFHD added to existing background ambient air concentrations falls below the 24-hour and annual $PM_{2.5}$ NAAQS.

For uncertified SFHDs, setback distances are large because available emissions data shows that particulate matter emission rates from an operating unit are very high.

While certified SFHDs currently available for sale will meet EPA 2015 standards in the lab setting during certification testing, some emissions studies indicate that not every SFHD will meet the EPA standard when being operated in the field. An SFHD's ability to perform to the level of the standard can be confounded by poor sizing, installation or operation, especially if fuel is not properly seasoned. If a homeowner is unable to secure dry wood during the heating season, there is nothing within the devices that will prevent unseasoned wood from being burned. Therefore, the MPCA is recommending setback distances based on modeling of SFHD with emissions higher than the EPA certification standard. These SFHD are still far cleaner than uncertified SFHD.

For SFHD's that meet the 2020 certification standard, smaller setback distances could be possible than that shown in Table 1. Only a few cordwood burning SFHD models currently meet the 2020 standard and limited emissions data was available to justify establishing a setback distance less than 100 feet.

As more emissions information becomes available, the MPCA may revise the setback values in Table 1.

This information in this supplement is offered to help local decision-makers reduce the chance of air quality concerns on neighboring properties but not at the resident's property itself. It does not eliminate the possibility of nuisance conditions and cannot guarantee that the amount of $PM_{2.5}$ in the ambient air would always meet applicable air quality standards. The modeling performed cannot be used to demonstrate compliance

with an applicable ambient air quality standard. Further, other exposure time periods, wood smoke pollutants and associated odors were not evaluated.

TABLE 1. SFHD SETBACKS FROM PROPERTY LINE BASED ON CHIMNEY STACK HEIGHT AND SFHD CERTIFICATION STATUS

	Uncertified SFHD		EPA NSPS Certified SFHD
Landscape	**Flat to Rolling**	**Steep**	**All**
Chimney stack Height from the Ground	**Distance in Feet from SFHD chimney stack to Nearest Property Line**		
8’	1,000	1,300’	Not allowed
10’	860’	1,118’	100’
18’	500’	650’	
24’	100’	130’	
30’	100’	130’	

- Uncertified SFHD – SFHD is not certified to meet the EPA 2015 (Step 1) or the 2020 (Step 2) NSPS emission standards for hydronic heaters.
- EPA NSPS certified SFHD – SFHD meets the EPA 2015 or 2020 NSPS emission standards for hydronic heaters and has the EPA-required permanent label with “Certified to comply with the 2015 particulate emission standards” or “Certified to comply with the 2020 particulate emission standards”.

II. MORE INFORMATION

EPA’s list of certified SFHDs (hydronic heaters) which meet EPA's NSPS (Standards of Performance for New Residential Hydronic Heaters and Forced-Air Furnaces) requirements is located at http://www2.epa.gov/compliance/list-epa-certified-hydronic-heaters. MPCA’s Wood Smoke Coordinator can provide general wood smoke information and more information about using this model ordinance. A technical support document describing the modeling is available on MPCA’s webpage www.pca.state.mn.us/yhiz4d3 or from MPCA’s Wood Smoke Coordinator. Residential wood smoke information is also available on MPCA's Wood smoke webpage at www.pca.state.mn.us/yhiz4d3.