

PLACER COUNTY AIR POLLUTION CONTROL DISTRICT

STAFF REPORT

Rule 225, Wood Burning Appliances

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BACKGROUND

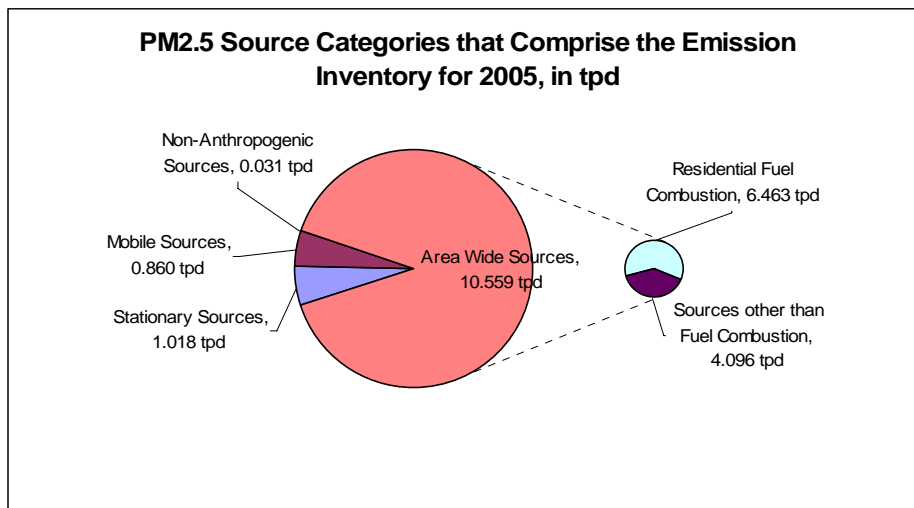
The Air Quality Problem:

Particulate matter (PM), generated from wood combustion, is composed of very small droplets of condensed organic vapors of wood and tar gasses. These particles are so small, it allows them to be inhaled deep into the lungs. Adverse health effects are linked to particles that are less than 10 microns in diameter (PM10), and the subset of fine particles that are less than 2.5 microns in diameter (PM2.5). According to the U.S. Environmental Protection Agency (EPA), health studies have linked exposure to PM, especially fine particles, to several significant health problems, including:

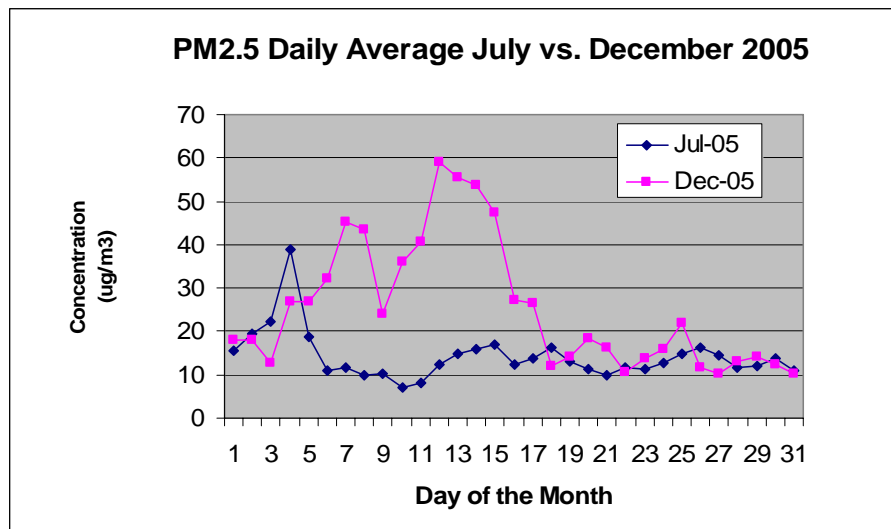
- Increased respiratory symptoms, such as irritation of the airways coughing, or difficulty breathing
- Decreased lung function
- Aggravated asthma
- Development of chronic bronchitis
- Irregular heartbeat
- Nonfatal heart attacks; and
- Premature death in people with heart or lung disease

Exposure to PM pollution can cause coughing, wheezing, and decreased lung function even in otherwise healthy children and adults. EPA estimates that thousands of elderly people die prematurely each year from exposure to fine particles. In addition, a recent study (Dominici et. al, 2006) of the correlation between PM2.5 concentrations and hospital admission rates concluded that short-term exposure to PM2.5 increases the risk of hospitalization for cardiovascular and respiratory diseases.

The Placer County Air Pollution Control District (District) is currently designated as a nonattainment area for the state PM10 standard. The 2005 emission inventory for Placer County shows that wood smoke accounts for 28.4% of wintertime PM10 emissions and 52.0% of wintertime PM2.5 emissions. Below is a chart that comprises the major categories of the Emission Inventory and the amount of tons that each category contributes for PM2.5 in 2005.

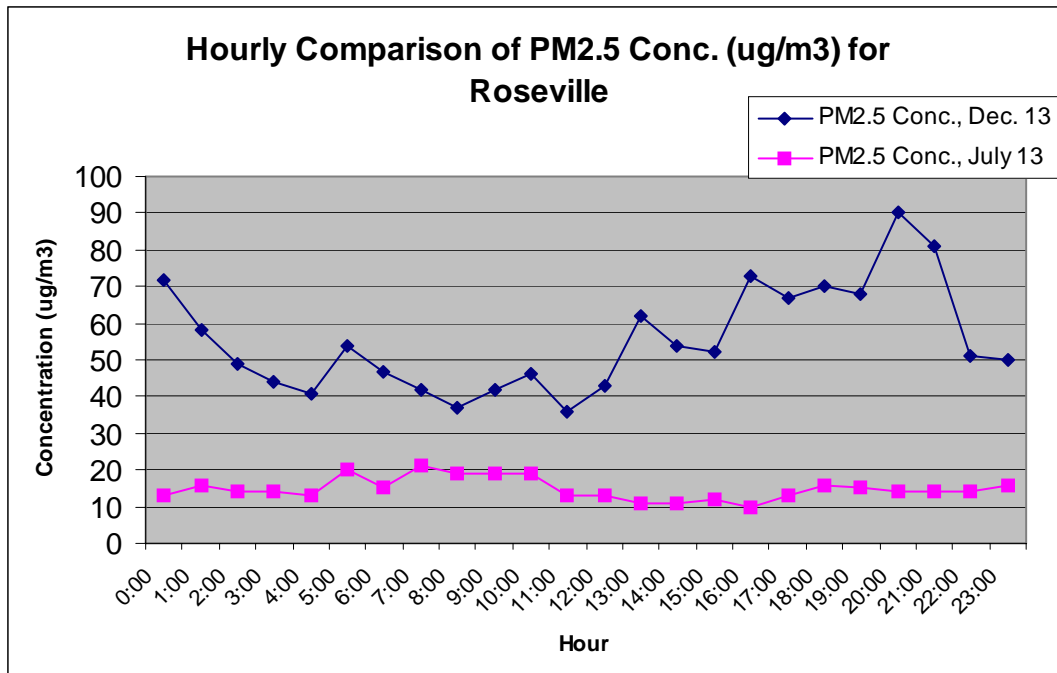


The combustion of wood generates PM emissions, primarily in sizes less than or equal to 2.5 microns. This sized particle can easily find its way deep into human lungs, causing irritation and exaggerating respiratory issues. Data provided by the Air Resources Board (ARB) air monitoring devices in the Roseville area has provided sufficient data to show how PM_{2.5} concentrations rise during winter months due to wood smoke combustion. As an example, the graph below compares daily concentration averages, during July and December of 2005 at the ARB Roseville monitoring site.



For the month of July, PM_{2.5} concentrations appear to primarily fluctuate between 10 and 20 $\mu\text{g}/\text{m}^3$ (micrograms per cubic meter) concentrations, with a peak concentration on July 4th, due to firework shows. The primary source of PM_{2.5} emissions during this month originates from on-road mobile sources, since the monitoring station is close to the highway. This is the typical trend observed during summer months. In contrast, the month of December's concentrations far exceed July's, reaching a high of 59 $\mu\text{g}/\text{m}^3$ and often staying well above July's daily concentrations.

It is verified that the winter months usually have higher PM concentrations than do summer months. Another trend worth examining is the time of day when concentrations are at their highest. The graph below displays the concentrations for one day in December of 2005 versus one day in July, for Roseville. Hourly concentrations for July tend to remain more stable and fluctuate less, whereas PM_{2.5} concentrations for December experience tall peaks and greater fluctuations. The highest concentrations for December are observed in the evening and morning times, when it is assumed that wood burning appliances are in use. The graph also reveals a much greater concentration of PM_{2.5} throughout the thirteenth of December compared to the thirteenth of July.



The chart below displays the first and second highest concentrations of PM2.5 measured in the Roseville area for 2004, 2005, and 2006. Note that the highest concentrations measured were recorded in winter months, except for one reading, during the time wood burning appliances were in use. The one reading that violates the pattern of highest PM2.5 concentrations in the winter is the reading for September 13, 2006. This higher than normal reading, is most likely attributed to the Ralston Fire, which had a significant impact on air quality in the entire region.

	Date	Measurement	Date	Measurement	Date	Measurement
First Highest Readings	11/8/2004	47.8 µg/m ³	12/12/2005	59.2 µg/m ³	9/13/2006	54.7 µg/m ³
Second Highest Readings	11/7/2004	43.4 µg/m ³	12/13/2005	55.3 µg/m ³	12/25/2006	51.7 µg/m ³

The new and revised EPA Ambient Air Quality Standard for PM2.5 is 35 µg/m³ for the 24 hour daily average. Any concentrations over this amount may place the area in nonattainment. The above graph and chart verify that there is a need to offset PM2.5 emissions, during winter months in order to avoid further restrictions that may fall on Placer County citizens and the business community, should the County be designated as nonattainment for PM2.5.

A Wood Burning Appliance Control Measure:

Senate Bill 656 (SB 656, Sher, Health and Safety Code Section 39614) required the ARB to develop a list of the most readily available, feasible, and cost-effective control measures that could be employed to reduce PM emissions, and

each air district to adopt an implementation schedule for the most cost-effective measures. In November of 2004, ARB adopted a list of PM control measures to be considered by districts, and in June of 2005, the District adopted an implementation schedule for SB656.

The following measures for wood burning appliances were contained in the District's SB656 implementation schedule:

- Require use of USEPA-Certified Phase II or equivalent devices
- Public Awareness Program with either a voluntary curtailment or mandatory curtailment
- Require replacement of non-certified appliances upon sale of property
- Restrict number of wood burning fireplaces allowed in new residential developments
- Control of wood moisture content. Prohibit burning materials that are not intended for use in fireplace/heater

The District committed to complete further study of each of these measures in 2006, and if found to be feasible, adopt the measures by the end of 2007. The amendment of Rule 225 is being proposed to implement several of these wood burning measures. Rule 225, Wood Fired Appliances, currently applies only to the Squaw Valley portion of the District and contains limitations on emissions that have been overtaken by more recent EPA standards for wood fired appliances. The Rule, which was originally titled to read Wood Fired Appliances, will be changed to read Wood Burning Appliances under the amendments being proposed. In addition, Rule 225, as amended, will implement the following control measure elements:

- Prohibit the installation of any new, permanently installed, indoor or outdoor, uncontrolled fireplaces in new or existing developments
- Prohibit the sale and installation of any wood burning appliance that is not U.S. EPA Phase II certified, or equivalent
- Require proper operation of U.S. EPA Phase II certified wood burning appliances
- Require distribution of educational information about wood burning at point of sale of new wood burning appliances
- Prohibit burning of garbage and other items not intended for use as a fuel
- Require that all non-certified free standing wood stoves be removed or rendered inoperable upon point of sale of real property

Restrictions on wood burning appliances have been adopted by several California air districts and other local jurisdictions, including:

- San Joaquin Valley Unified APCD
- Yolo-Solano AQMD
- Great Basin Unified APCD
- Shasta County AQMD
- Feather River AQMD
- San Luis Obispo County APCD
- Glenn County APCD
- Butte County AQMD
- Kern County APCD
- City of Sebastopol
- Sacramento Metropolitan AQMD

Appendix A contains a detailed list of the specific measures adopted by these districts and local governments.

Traditional uncontrolled fireplaces are usually one of two types: site installed masonry fireplaces and factory built fireplaces. These units are used primarily for aesthetic purposes or to provide space heating. The main source of emissions from these units is from incomplete combustion.

Wood stoves are wood burning appliances that are enclosed to control combustion air. EPA certified stoves employ either non-catalytic or catalytic systems, to provide for more complete combustion of the exhaust stream. These units are either stand alone or installed into walls, either as a new unit or into existing fireplaces. Pellet stoves burn pellets made from wood products, and utilize fuel and active air management systems to control the combustion efficiency. Masonry heaters are large units designed to burn a fire quickly, absorb the heat within the structure, and release the heat slowly. In addition to increasing combustion efficiency, many stoves have fan systems to circulate heated air into the home, increasing the thermal efficiency. For this rule, control measures for wood burning fall into two categories: improving combustion efficiency and replacing fuels. Improved combustion controls include EPA certified wood stoves and proper burning techniques. Replacement fuels include natural gas and electricity.

The most widely used alternate fuel is natural gas (NG). Simple systems employ natural gas piped into a hearth with gas logs to produce the look of a wood burning fire. Natural gas inserts are installed into walls or existing fireplaces and can be equipped with fan systems to circulate heated air into the home.

Another alternative to wood burning is an electric fireplace. Electric fireplaces use lights or other means to simulate fire, and can include electric space heating elements, fan systems to circulate heated air into the home, and air filtration.

LEGAL MANDATES

Federal Mandate:

The District has attained the previous federal PM2.5 standard, and has attained the federal ambient PM10 standard. However, the District has the potential to be designated nonattainment for the new federal PM2.5 standard. If so, a nonattainment designation is expected in November 2009 and attainment plans will be due by 2013. Emissions from residential wood combustion will need to be controlled in order to attain or even maintain the federal PM2.5 standard.

State Mandates:

The District is currently designated as a nonattainment area for the state PM10 standard. SB 656 required ARB to adopt a list of the most feasible and cost effective control measures to make progress towards state and federal PM10 and PM2.5 standards. Districts were then required to adopt an implementation schedule for measures by July 31, 2005. In June, 2005, the District adopted the following schedule for control measures for wood burning appliances.

PM Control Measures and Schedule

Control Measure	Further Study Completed	If Cost-effective Emission Benefit Determined	
		Consideration by the Board	If adopted, Full Implementation Date
Require use of USEPA-Certified Phase II or equivalent devices	2006	2007	2008
Require replacement of Non-certified units upon sale of property	2006	2007	2008
Control wood moisture content, prohibit materials not intended for use in wood burning appliance	2006	2007	2008
Restrict number of wood burning fireplaces allowed in new residential developments	2007	2007	2008
Prohibit burning materials that are not intended for use in fireplace/heater.	2007	2007	2008

Proposed Rule 225 implements most of these control measures in accordance with the SB 656 schedule.

SUMMARY OF REQUIREMENTS

Rule 225 applies to any person who manufactures, sells, advertises, offers for sale, installs, or operates a wood burning appliance in Placer County. As amended, Rule 225 will:

- Prohibit the installation of any new, permanently installed, indoor or outdoor, uncontrolled wood burning appliance in new construction, beginning on January 1, 2009
- Prohibit the installation of any new, permanently installed, indoor or outdoor, uncontrolled wood burning appliance in existing developments, beginning January 1, 2012
- Require that all installations of wood burning appliances be U.S. EPA Phase II certified, or equivalent
- Require proper operation of all wood burning appliances
- Require distribution of educational information about wood burning at point of sale of new wood burning appliances, beginning January 1, 2009
- Prohibit burning of garbage and other items not intended for use as a fuel
- Requires that all visible smoke from wood burning appliances not exceed a 20% opacity, except for startup
- Require that all non-certified free standing wood stoves rendered inoperable upon point of sale of real property, beginning January 1, 2012

The rule allows for the installation of pellet stoves and masonry heaters as an alternative compliance option, for this Rule. Due to the requirements set forth in Title 40 Code of Federal Regulations, Part 60, Subpart AAA, most appliances in these classes are unable to receive certification¹. However, these devices have emission factors that are even lower than certified wood burning appliances. Therefore, they are included as allowable alternative appliances.

The District is not requiring wood burning appliance owners to remove or replace existing appliances unless it is a free standing wood stove included in a point of sale transaction. However, should an appliance owner wish to upgrade their wood burning appliance, the new unit must meet current EPA certification standards or be equivalent, effective January 1, 2012. Should the proposed amendments to Rule 225 be adopted, the District plans to offer a four year incentive program to assist homeowners with this condition. The incentive program will be discussed in further detail later in this staff report. Chimineas and outdoor fire pits, which are designed for portable, outdoor use, are not covered by this rule. For a brief review of proposed amendments, refer to Appendix B.

¹ Title 40, Code of Federal Regulations, Part 60, Subpart AAA definition of wood heater includes the following criteria: an air-to-fuel ration less than 35-to-1, and a maximum weight of 1760 pounds. Pellet stoves typically have an air-to-fuel ration greater than 35-to-1. Masonry stoves typically weigh more than 1760 pounds.

EMISSIONS IMPACT

Targeted EIC Categories and Inventory 2005:

The ARB emissions inventory for wood burning in Placer County is summarized in the following table. Total winter PM10 emissions in 2005 are 6.7 tons per day or 1225 tons per year and PM2.5 emissions are 6.5 tons per day or 1179 tons per year.

Average Winter Emissions for 2005

CES/EIC Codes	Category Name	PM10 Emissions TPD (tons per day)	PM2.5 Emissions TPD
610-600-0230-0000	Wood Comb - Wood Stoves	5.265	5.060
610-602-0230-0000	Wood Comb.- Fireplaces	1.457	1.403
	Total	6.713	6.463

The above table displays the emissions inventory for existing wood stoves and fireplaces within the County. The current amendments that are being recommended for adoption will primarily effect emissions from new wood burning appliance installations and at point of property sales or transfers. EPA certified wood burning appliances did not become readily available to the public until July 1992. As with some newer homes, many of these pre-1992 homes will have fireplaces or wood stoves that do not meet EPA certified emissions standards. Unless these homes with non-certified free standing wood stoves have been upgraded, then these will be a primary target for emission reductions in the wood stove incentive program and at the point of property sale.

With an uncertain real estate future it is difficult to determine the rate of future housing sales. Some research says sales will improve, while others say that it will stay the same or get even worse. Therefore, future housing sales will be based on 2006 real estate trends for pre-1992 homes within the County. With data retrieved from the Placer County Assessor’s Office and from Staff Surveys, Point of sale emissions are based on the following assumptions:

Pre-1992 home sales within Placer County:

- 20% of homes sold with a wood burning appliance have a non-certified free standing wood stove
- 40% of appliances will be removed and destroyed or replaced with a gaseous appliance upon point of property sale
- 60% of appliances will be replaced with an EPA phase II certified wood burning appliance (or equivalent)
- An average cord of wood weighs 1.19 tons
- An average 1.48 cords of wood are burned every year per non-certified appliance

Even though the majority of homes built with non-certified appliances were built prior to 1992, non-certified stoves could still be bought new and used on the internet, outside the county, or elsewhere for homes after 1992. Therefore, a small amount of post 1992 homes will be affected by the proposed rule amendments. For post 1992 home sales emission reductions are based on the assumptions below:

Post-1992 home sales within Placer County

- 5% of homes sold will have a non-certified free standing wood stove
- 40% of appliances will be removed and destroyed or replaced with a gaseous appliance upon point of property sale
- 60% of appliances will be replaced with an EPA phase II certified wood burning appliance (or equivalent)
- An average cord of wood weighs 1.19 tons
- An average 1.48 cords of wood are burned every year per non-certified appliance

This proposed requirement requires the removal of non-certified free standing wood stoves in homes and properties at point of sale. A free standing wood stove is an appliance that has not been built into the structure of a building. It rests upon a hearth and is attached to the structure via the chimney. The most effective and easy option for compliance with this requirement would be for affected residential units to have no other fuel burning appliance installed. This would lead to a 100% reduction in emissions from those appliances.

New installations of wood burning appliances, such as those installed in new homes and new residential developments, will also be affected by this rule. The effectivity date for this proposed condition is January 1, 2009. The emission reductions will be based on the assumption that new developments being built will mirror existing installation and usage patterns for 2006. Emissions are based on the following assumptions:

New Construction:

- 5% of all new construction will install a non-certified appliance (ie. fireplace)
- An average of 1.48 cords per non-certified appliance is burned each winter
- An average cord of wood weighs 1.19 tons

Based on new residential construction in 2006, an additional 6.75 tons per year (tpy) of PM was added to the County's emission inventory. The amount of reduction from new construction will vary based on the method of compliance chosen; however, an estimated 2.67 tpy will be reduced after the first year of implementation. Emission calculations and data analysis are presented in Appendix C.

The most logical installation choice for any scenario is to install either an EPA Phase II certified wood stove/insert, masonry heater, or pellet-fueled wood burning stove. These appliances control emissions through a combination of techniques, including controlling air flow, regulating the burn rate, promoting more complete combustion, and improving thermal efficiency. These appliances both have lower emissions per pound of wood and reduce the amount of wood consumed. This option will lead to a minimum 74.0% reduction in emissions for those units affected by this rule.

An option for areas with natural gas or propane availability is to install gas-fired appliances instead of wood burning appliances. Due to the low PM emissions from burning natural gas, this option will lead to a 99.9% reduction in PM emissions for those units affected by this rule.

Installing electric fireplaces instead of wood burning appliances or natural gas stoves is not required, but an excellent option for heating purposes, especially those using a stove for aesthetic purposes. Electric fireplaces are a combination of electric space heaters and simulated flames. The heating elements can often be operated independent of the flames. Since the heating element for these systems is an electric resistor, no emissions are produced at the source; therefore there is a 100% reduction in emissions.

Two of the main proposed conditions of Rule 225 will have a delayed effectivity date of four years. They are the removal of non-certified free standing wood stoves at point of sale (POS) and secondly, all installations of wood burning appliances that replace existing appliances must be EPA Phase II certified or equivalent. These requirements will not be effective until January 1, 2012 and are being delayed so that the District can first implement a four year County wide wood stove incentive program.

The District believes that the best way to combat emissions from wood burning appliances is to combine new and effective regulations with a County wide incentive program. This will encourage people to upgrade their appliances with efficient heat producing technologies prior to rule effectivity or for those who will not be affected by the rule changes, via incentives that may range from \$600 to \$1,000 dollars. Actual incentive amounts are still being considered. Running a four year incentive program, beginning in 2008 and ending in 2011, will allow the District to claim additional emission reductions, assist homeowners with compliance, and bring awareness to effective and efficient wood burning techniques.

Any county resident who owns a non-certified open hearth fireplace, wood stove insert, or free standing wood stove and wishes to upgrade their appliance will be able to take advantage of this program. The incentives may be higher for those switching to gas or pellet appliances or for those that require additional financial

support. Details of the incentive program will be worked out in early 2008, should the proposed amendments to Rule 225 be adopted. Installations of appliances in new construction will not be available for incentive funds. The chart below lists incentive amounts being considered.

Incentives Being Considered

Upgrade	Potential Incentive
EPA Phase II Appliance	\$600- 700
Gas Stove/Pellet Stove	\$800
EPA Phase II Appliance (for those who need additional financial assistance)	\$1,000

With the recent success and financial settlement of the Sierra Pacific Industries civil complaint case, the District is considering using some of the earned interest from the SPI settlement fees as the funding source for this program. Depending on the response from the community, the District hopes to set aside at least \$70,000 initially in 2008 and then adjust the amount in subsequent years in concert with the annual Budget Development. Additional funding sources might arise from mitigation funds, enforcement actions, and from fines issued to parties that violate Rule 225. Assuming the funding availability remains at \$70,000 per year, until 2012, there is a potential to upgrade a total of 400 wood burning appliances in the County and provide a PM emissions reduction of 7.4 tons.

There are still remaining funds from our current incentive wood stove change out program for the City of Colfax and Martis Valley. These funds will be absorbed into the County wide program, beginning next year, but still will only be available for their specified area.

The proposed control measures in the amended Rule are expected to reduce PM emissions up to an estimated 20.76 tons after the first year of implementation. The emission reductions should continue to increase each subsequent year, as new construction continues and until all old appliances have been replaced. With a four year incentive program prior to an effective date, the emission reductions after the first year of implementation could reach 27.2 tons.

COST IMPACT

Section 40703 of the California Health and Safety code requires that the District consider and make public its finding relating to the cost effectiveness of implementing an emission control measure.

Cost to Businesses:

The proposed rule will require builders to either not build or install non-certified appliances or install appliances compatible with the rule. While not installing a

wood burning appliance would save the builder cost, consumer demand in some cases is expected to require installation of some other option. Therefore, the cost to the builders will be the increased cost of purchasing and installing certified appliances or other units.

The following table shows the range of additional cost of installing a compliant wood burning appliance or other device in place of a non-certified wood burning appliance.

Device	Incremental Capital/Installation Cost (per unit)	Total Cost (\$/yr)*
Electric Fireplace	\$400	\$401,600
Natural Gas/Propane Stove Insert	\$2,500	\$2,510,000
EPA Certified Phase II Wood Stove Non-Catalytic	\$2,500	\$2,510,000

*Total incremental cost of compliance for each type of device if all non-certified appliances that would have been installed use each option (1004 appliances). For example: 1004 electric fireplaces cost \$401,600.

Cost to the Public:

The cost of the additional equipment required by a builder, of a new home, is likely to be passed on to home buyers. The additional cost is less than 0.6% of the median price of a home in Placer County, and is not expected to have a large impact on the affordability of new houses or the housing market in general. In residences undergoing a point of property sale or transfer, any additional costs could be shared by both the seller and the buyer or by either party. To eliminate any additional costs, the appliance could simply be rendered inoperable.

Overall Rule Cost Effectiveness:

The cost effectiveness of the rule is dependent on the compliance methods chosen. To calculate the overall cost effectiveness for the proposed rule, the District has assumed a mixture of compliance methods. The detailed calculations are presented in Appendix C. The range of overall cost effectiveness is estimated to be around \$14,909 to \$20,127 per ton of PM reduced. Compared to the cost effectiveness requirement of the Carl Moyer grant program, which is \$14,300 and \$20,000 for AB2766 funds this is within acceptable parameters.

SOCIOECONOMIC IMPACT

CHSC Section 40728.5 requires a district to perform an assessment of the socioeconomic impacts before adopting, amending, or repealing a rule that will significantly affect air quality or emission limitations. The District Board is required to actively consider the socioeconomic impacts of the proposal and make a good faith effort to minimize adverse socioeconomic impacts.

CHSC Section 40728.5 requires discussion of:

- The type of industry or business, including small business, affected by the proposed rule or rule amendments.
- The impact of the proposed rule or rule amendments on employment and the economy of the region.
- The range of probable costs, including costs to industry or business, including small business.
- The availability and cost-effectiveness of alternatives to the proposed rule or rule amendments.
- The emission reduction potential of the rule or regulation.
- The necessity of adopting, amending, or repealing the rule or regulation to attain state and federal ambient air standards.

Type of industry or business, including small business, affected by the rule:

Rule 225 applies to the installation and use of wood burning appliances. This rule will affect large and small businesses, as well as the general public. Large businesses affected include the building industry and manufacturers of wood burning appliances. Examples of small businesses affected are retailers, chimney sweeps, wood suppliers, restaurants, and hotels.

Impact of Rule 225 on employment and the economy in the District:

This rule is expected to have minimal impact on employment and the economy. The industry most affected by this rule is the building industry. While the requirement to install alternatives to traditional fireplaces will require some adjustment on their part, the rule is not expected to cause any slowdown in construction. While some jobs within the industry may be reduced, (e.g., masons), the reduction should be offset by an increase in others (e.g., stove installers). Since this rule is targeted at new installations and point of property sales/transfers, it is not expected to have a significant impact on existing wood usage and sales by wood suppliers.

Range of probable costs of Rule 225:

The estimated maximum incremental costs, assuming that all appliances replaced are non-certified, per household for compliance with the rule are listed in the table below.

Compliance Method	Incremental Compliance Cost (\$/unit)
Electric Fireplace	\$400
Natural Gas Insert	\$2500
EPA Certified Wood Burning Appliance	\$2500

Availability and cost-effectiveness of alternatives to the Rule 225:

One alternative to the proposed rule changes is not to adopt the proposed rule. However, the PM emission reductions from this rule will assist the District in meeting federal and state PM10 and PM2.5 air quality attainment goals. In addition, adoption of these proposed rule amendments will implement several of the measures required by SB656.

Two additional control measures will be included in a Further Study measure: mandatory curtailment and density restrictions for all wood burning appliances. These measures are not mutually exclusive, and each can provide emission reductions in addition to those provided by proposed amendments of Rule 225. If these additional control measures are found to be feasible, they may be considered for adoption at a later date.

The emission reduction potential of Rule 225:

The proposed rule will achieve an emission reduction estimated to be 20.5 tons of PM per year after the first year of implementation, and the benefits will increase by this amount each year as additional housing units are built and sold (See discussion under Emissions Impact) and the change out of non-certified appliances at point of property sale continues.

The necessity of amending or repealing the rule or regulation to attain state and federal ambient air standards:

The proposed amendments to Rule 225 are necessary to comply with feasible and most effective control measures requirements of SB656 and to provide PM10 and PM2.5 emission reductions that contribute to attainment of the state particulate matter standards.

INCREMENTAL COST EFFECTIVENESS ANALYSIS

Pursuant to Health and Safety Code Section 40920.6(a)(3), the District is required to perform incremental cost effectiveness analysis prior to adopting rules to meet the requirements for Best Available Retrofit Control Technology (BARCT). Rule 225 is not being adopted to meet a BARCT requirement; therefore an incremental cost-effectiveness analysis is not needed.

OTHER FACTORS:

Technological Feasibility:

Staff evaluated the technological feasibility of the rule amendments. All technologies required are readily available and have been in use for some time. Some remodeling may be needed to install new units into existing structures, but this is a common service provided by retailers. Additional compliance options may become available in the future if fireplaces that can meet the EPA Phase II emissions limits are developed.

Enforceability:

The compliance of installed devices can be determined by verifying the model of an installed unit. The EPA maintains a list of Phase II certified wood burning appliances. Additionally, any certified appliance is required to carry a certification plate. Natural gas units will carry certification to the applicable ANSI standard. With intensive efforts over the next 4 years aimed at coordinating with homeowners and the real estate community, the District hopes to achieve an acceptable level of enforceability for point of sale stove compliance. For new construction, it will be fairly easy to enforce the EPA standards for wood burning

appliances. The District, County, and City Building Departments will integrate a protocol, which requires the District to sign off on all building permits that include the installation of a wood burning appliance, in order to verify compliance with the requirements of the rule.

Public Acceptability:

A number of districts have adopted similar measures. Many of these programs have been in effect since the early to mid-1990's. The San Joaquin and Yolo-Solano districts have rules which include most of the measures included in Rule 225. The Tahoe Regional Planning Agency and San Joaquin Valley APCD require wood stove change outs at point of sale.

SECTION 40727.2(a) ANALYSIS OF RULE 225

Section 40727.2(a) of the Health and Safety Code mandates that the District prepare a written analysis of the proposed Rule amendments. Section 40727.2(a) also allows the District to put this analysis in a matrix form. The matrix analysis of Rule 225 is presented as Appendix D.

ENVIRONMENTAL REVIEW AND COMPLIANCE

Proposed Rule 225 does not create new requirements that may have an adverse effect on the environment. Pursuant to state CEQA Guidelines, the District's Environmental Coordinator finds that the adoption of the proposed rule is exempt from CEQA (Class 8 Categorical Exemption, Action by Regulatory Agencies for Protection of the Environment; §15308 State CEQA Guidelines).

California Public Resources Code (Section 21159) requires an environmental analysis of the reasonably foreseeable methods of compliance. The proposed rule will not increase emissions and will not cause any significant adverse effects on the environment; therefore the Environmental Coordinator has concluded that no environmental impacts will be caused by compliance with the proposed rule.

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**Appendix A
Measures Adopted by Other Districts**

District	Rule(s) Number	Control Measure
San Joaquin Valley Unified Air Pollution Control District	Rule 4901	Retailer Public Information and Mandatory Curtailment
		No new wood stove or wood burning fireplace insert unless it is EPA Phase II certified or is a pellet-fueled wood burning heater
		Upon sale or transfer of real property each wood burning heater must be EPA Phase II certified, a pellet fueled wood burning heater, permanently rendered inoperable, or removed.
		No wood burning fireplaces in new residential development with density greater than 2 dwelling units per acre. No more than 2 EPA Phase II certified wood burning heaters per acre in new development with density of ≥ 3 dwelling units per acre. No more than 1 wood burning fireplace or wood burning heater per dwelling unit in any new development with density ≤ 2 dwelling units per acre.
Yolo-Solano Air Quality Management District	Rule 2.40	Retailer Public Information
		No new wood heating device unless it is EPA Phase II certified or equivalent (includes fireplaces)
		Wood moisture content of 20% or less for seasoned wood, and Prohibited Fuel Types
Great Basin Unified Air Pollution Control District-Town of Mammoth Lakes	Rule 431	Pollution Reduction Education Program and Mandatory Curtailment
		No new solid fuel burning appliance unless it is EPA Phase II certified (includes any fireplace or wood heater)
		Upon sale or transfer of a majority interest in any real property, existing non-certified solid fuel appliances shall be replaced, removed, or rendered inoperable
		No more than 1 solid fuel appliance in any dwelling or nonresidential property
Tehama County Air Pollution Control District	Rule 4.27	Voluntary Curtailment
		No new wood heating device unless it is EPA Phase II certified (does not include fireplaces) and Fireplaces in new construction must either use EPA Phase II certified insert or meet <7.5 grams/hour of total particulate matter
		Prohibited Fuel Types
Feather River Air Quality Management District	Rule 3.17	Voluntary Curtailment
		No new wood heating device unless it is EPA Phase II certified (does not include fireplaces and wood cook stoves)
Shasta County Air Quality Management District	Rule 3.23	Voluntary Curtailment
		No new wood heating device unless it is EPA Phase II certified (does not include fireplaces and wood cook stoves) and Fireplaces in new construction must either use EPA Phase II certified insert or meet <7.5 grams/hour of total particulate matter
		Prohibited Fuel Types

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District	Rule(s) Number	Control Measure
San Luis Obispo County Air Pollution Control District	Rule 504	Retailer Public Information and Voluntary Curtailment
		No new wood heating device unless it is EPA Phase II certified(includes fireplaces)
		Wood moisture content of 20% or less for seasoned wood, and Prohibited Fuel Types
Glenn County Air Pollution Control District	Section 99.2	Voluntary Curtailment
		No new wood heating device unless it is EPA Phase II certified (does not include fireplaces) and Fireplaces in new construction must either use EPA Phase II certified insert or meet <7.5 grams/hour of total particulate matter
		Prohibited Fuel Types
Butte County Air Quality Management District	Rule 207	Retailer Public Information
		No new wood heating device unless it is EPA Phase II certified (includes fireplaces)
		Prohibited Fuel Types
City of Sebastopol	Chapter 15.70	Education Program and Voluntary Curtailment
		No new wood heating device unless it is EPA Phase II certified or is a pellet-fueled appliance or is a dedicated gas log fireplace or gas stove (includes fireplaces)
		Remove or replace non-certified units when interior remodel or renovation requires a building permit, the work exceeds \$3500, and the work is in the same room as the unit, and Effective June 1, 2005, it unlawful to use non-certified wood heaters within the City of Sebastopol except in the case of hardship. Effective June 1, 2007 non-certified wood heaters are no longer allowed for hardship cases which are sole source of heat, a temporary source of heat, or an inadequate alternative source of heat.
		Prohibited Fuel Types
Kern County Air Pollution Control District	Rule 416.1	Retailer Public Information
		No new wood heating device unless it is EPA Phase II certified Kern County (does not include fireplaces)
		No person shall install a wood burning fireplace in a new residential subdivision which will consist of 20 or more dwelling units.
Sacramento Metropolitan AQMD	Rule 417	No new wood heating device unless it is EPA Phase II certified or is a pellet-fueled appliance or is a dedicated gas log fireplace or gas stove (includes fireplaces)
		Voluntary Curtailment
		Retailer Public Information
		Wood moisture content of 20% or less for seasoned wood, and Prohibited Fuel Types
		Prohibited Fuel Types

Appendix B
SUMMARY OF PROPOSED AMENDMENTS
Rule 225, Wood Burning Appliances

New Section Number	Existing Section Number	Proposed Language
101	N/A	Sets the purpose of the rule to limit PM emissions from wood burning appliances
102	N/A	Sets the rule applicability to anyone person who manufactures, sells, advertises, offers for sale, supplies, transfers, or operates a permanently installed wood burning appliance in Placer County.
103	N/A	Incorporates the District's standard severability language in case the rule is challenged in court.
104.4	N/A	Exempts appliances subject to the Rule 225 from Rule 202.
104.5	N/A	Exempts fireplaces from the requirements of Section 303
201	N/A	Defines APCO as Air Pollution Control Officer
204	N/A	Defines District as the Placer County Air Pollution Control District
209	N/A	Sets the definition of a multiple residential development as dwelling groups or apartments with three or more total units located on a parcel where the use is specified in Section 1608.2 of the Placer County Zoning Ordinance is allowable.
210	N/A	Defines New Installation as any wood burning appliance that is installed and is not replacing as existing wood burning appliance.
211	N/A	Sets the definition of seasoned wood that has been sufficiently dried so as to contain less than 20% moisture by weight.
217	N/A	Sets the definition of single family residential structure as a detached building occupied by one family and located on a parcel where the uses are specified in Section 17.04.030 of the Placer County Zoning Ordinance are allowable.
301	N/A	Requires that all wood burning appliances must be certified to at least EPA Phase II certification standards as set forth in Title 40 CFR, Part 60, Subpart AAA, or equivalent.
302.2.1	N/A	Requires any person that sells or installs new wood burning appliances to distribute wood burning information with the sale of each wood burning appliance.
302.2.2	N/A	Prohibits the selling, supplying, advertising, or transferring, of a new non-certified wood burning appliance.
302.2.3	N/A	Prohibits the installation of a non-certified appliance in new construction.

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New Section Number	Existing Section Number	Proposed Language
302.2.4	N/A	Allows for certified appliances in open areas only, in multiple residential developments.
302.3.1	N/A	Prohibits the installation of a new or used non-certified wood burning appliance under any circumstance.
302.3.2	N/A	Unless otherwise stated in the rule, only one certified wood burning appliance shall be allowed per commercial or single family residential structure.
303.1.1	N/A	No person shall sell or transfer property without first assuring the District that all non-certified free standing wood stoves are removed, replaced, or rendered inoperable.
303.1.2	N/A	States that the seller of real property shall verify to the APCO, in the form of written documentation, that compliance has been achieved prior to sale or transfer.
303.1.3	N/A	States that each real property may be subject to inspection by the APCD or other approved agency, prior to sale or transfer.
304.1	N/A	Specifies operating parameters of all wood burning appliances.
304.2	N/A	Requires that all visible smoke from wood burning appliances not exceed a 20% opacity.
305.1	N/A	Prohibits the use of illegal materials in wood burning appliances
401	N/A	States that the Air Pollution Control Officer may request verification from a manufacturer that a wood burning appliance meets the EPA Phase II certification standards.
501.1	N/A	Sets the test for air-to-fuel ratio as EPA Test Method 28A
501.2	N/A	Sets the test for wood moisture content, based on ASTM test method D4442-92

Appendix C
Rule 225, Wood Burning Appliances
Calculations and Cost Analysis

The cost of compliance with this rule is the incremental cost of the new equipment and its installation required under this rule. In other words, any additional costs over what would normally be installed prior to rule implementation. The total cost of the appliance installed is amortized over the expected life of the unit, which is estimated at 15 years, using the capital recovery equation. A 7% interest rate is assumed in the equation and the assumption will be made that the equation has no salvage value at the end of the fifteen-year cycle.

Annualized Capital Cost: $A = P * [i(1 + i)^n]/[(1 + i)^n - 1]$

Where: A = Annual Cost

P = Incremental Capital and Installation cost

i = Interest Rate (7%)

n = Equipment Life (15 years)

The fuel cost savings for the compliant equipment is calculated as the difference between the cost of wood for traditional methods of wood burning and the cost of fuel for the compliant options. The cost of wood includes the fact that a percentage of wood is obtained at no cost.

The total cost is:

Total Cost = (Annualized Capital Cost) – (Cost Savings)

The cost effectiveness of the rule is:

Cost Effectiveness = (Total Cost) ÷ (Emissions Reduction)

Variables used in the rule analysis are summarized in the following tables:

Appendix C
Rule 225, Wood Burning Appliances
Calculations, Factors, and Cost Analysis

General Wood Burning Factors and Variables			
Factor/Variable	Total	Units	Source
Percent of Wood that is Purchased	51.4	%	SMAQMD Rule 417 Staff Report
Uncontrolled Wood Burning Appliance EF	34.6	lb PM ₁₀ /ton of wood	AP 42 1.9
Controlled Wood Burning Appliance EF	14.6	lb PM ₁₀ /ton of wood	AP 42 1.10
Days of Operation per Appliance	120	Days per Winter	Staff Survey
Cost of Wood	225	\$/cord	Staff Survey
Cost of NG	13.00	\$/mmBtu	Staff Survey
Cost of Electricity	0.11	\$/KwH	Staff Survey
Volume Cord of Wood (excluding void space)	79	Ft ³ /cord	Staff Survey
Density of Pacific Hardwood	30	lb/ft ³	"Density of Wood", 2000
Heat Input Rate of NG Insert	42,000	Btu/hr	Haley Comfort Systems
Daily Operating Hours of a NG stove	2.6	Hrs.	Consumer Survey, HPBA
Incremental Cost to Install Cert. Wood Burning Appliance	\$2500	Per appliance	Staff Survey
Incremental Cost to Install Gas Stove Insert	\$2500	Per appliance	Staff Survey
Incremental Cost to Install Electric Fireplace	\$400	Per appliance	SMAQMD Rule 417 Staff Report
Average Wood Usage per Household (with non-Cert. Appliances)	1.48	Cords	Staff Survey - URBEMIS
Average Wood Usage per Household (with Certified Appliances)	0.92	Cords	SMAQMD Rule 417 Staff Report

Wood Burning Factors and Variables: New Construction			
Factor/Variable	Total	Units	Source
New Residential Construction	3178	units	US Census Bureau
Homes Affected by Rule	5	%	Staff Survey

Appendix C
Rule 225, Wood Burning Appliances
Calculations, Factors, and Cost Analysis

Wood Burning Factors and Variables: <1992 Point of Sale (POS)			
Factor/Variable	Total	Units	Source
Total # of pre-92 Homes with Wood Burning Appliances in County	29,438	“	Placer County Assessor’s Office
Pre-1992 Homes Sold in '06 w/Wood Burning Appliance	5,502	“	“
# of Pre-92 Homes with non-Certified Appliances	50	%	Staff Survey
# of Pre-92 Homes with non-Certified Free Standing Wood Stoves	20	%	“
# of Homes @ POS that Remove non-Certified Appliance Or Replace with a Gas Stove	40	%	“
# of Homes @ POS that Replace non-Certified Appliance with a Certified Appliance	60	%	“
Enforceability/Compliance Rate	65	%	“

Wood Burning Factors and Variables: >1992 Point of Sale (POS)			
Factor/Variable	Total	Units	Source
Total # of Post-92 Homes with Wood Burning Appliances in County	44,343	units	Placer County Assessor’s Office
Post-1992 Homes Sold in '06 w/Wood Burning Appliance	5001	units	“
# of Post-92 Homes with non-Certified Free Standing Wood Stoves	5	%	Staff Survey
# of Homes @ POS that Remove non-Certified Appliance Or Replace with a Gas Stove	40	%	“
# of Homes @ POS that Replace non-Certified Appliance with a Certified Appliance	60	%	“
Enforceability/Compliance Rate	65	%	“

Appendix C
Rule 225, Wood Burning Appliances
Calculations, Factors, and Cost Analysis

Factor/Result	<1992 POS	>1992 POS	New Construction
Number of Affected Residences:	683	162	159
Annual Emissions per non-Certified Appliance:	51lbs. PM/appliance		
Annual Emissions per Certified Appliance:	17.4 lbs. PM/appliance		
Annual Emissions of NG Appliance:	0 lbs. PM/appliance		
Total Emission Reductions (for all units)	14.8 tons/year	3.29 tons/year	2.67 tons/year
Annual Operational Cost Savings per appliance: ¹	\$64.80 ²		
Annualized Cost per appliance: ³	\$231		
Overall Cost Effectivity:	\$10,909 to \$14,727 per ton of PM Reduced		
Total PM Emissions Reduced:	20.76 Tons after first Year of Implementation		
Total PM Emissions Reduced (including incentive program):	27.2 Tons after first Year of Implementation		

¹ Costs, assuming baseline technology is a non-certified wood burning appliance and upgraded technology is an EPA certified appliance.

² Operational Costs for an EPA certified unit are about \$64.80 cheaper per year per appliance due to more efficient stove design.

³ Assuming upgrade is to an EPA certified appliance.

Appendix D
CH&SC 40727.2 Matrix for Proposed Amendments to Rule 225, Wood Burning Appliances

		Comparative Requirements	
Elements of Comparison	Specific Provisions	Amended Rule 225	40CFR60 Subpart AAA
Exemptions		Cook stoves, Previously Installed Wood burning Appliances	Cook stoves
Averaging Provisions		None	None
Units		g/hr	g/hr
Emission Limits		Catalytic Units: 4.1 g/hr Non-Catalytic Units: 7.5 g/hr	Catalytic Units: 4.1 g/hr Non-Catalytic Units: 7.5 g/hr
	Compliance Alternatives	Pellet Stoves, Masonry Heaters	None
Operating Parameters		Air-to-Fuel Ratio less than 35-to-1	Air-to-Fuel Ratio less than 35-to-1
Work Practice Requirements		None	None
Monitoring/Records	Record Keeping	None	None
	Frequency	None	None
Monitoring/Testing	Test Methods	ASTM test method D4442-92	Test Methods: -EPA Method 28A -Emission Concentration, if a dilution tunnel sampling location is used, Method 5G -Emission Concentration, if a stack location is used, Method 5H