



**South Coast
Air Quality Management District**
21865 Copley Drive, Diamond Bar, CA 91765-4178
(909) 396-2000 • <http://www.aqmd.gov>

**Wood Smoke Control Technology Forum
And Roundtable Discussion
(Held on August 15, 2007)**

Forum Summary and Report

Wood Smoke Control Technology Forum Summary and Report

Executive Summary

Introduction

Wood smoke emissions from residential wood burning in southern California contribute to exceedances of State and federal air quality standards for fine particulate matter or, more technically, PM_{2.5}. Wood burning can also produce carbon monoxide and toxic air contaminants. The 2007 Air Quality Management Plan (AQMP) adopted by the Governing Board on June 1, 2007 included a control measure to reduce emissions from residential wood burning. On August 15, 2007, the South Coast Air Quality Management District (AQMD) convened a one-day Technical Forum and Roundtable to discuss issues associated with wood burning in southern California. The goals of the Forum were:

- 1) Discuss the magnitude of wood smoke emissions to ambient PM_{2.5} levels in southern California;
- 2) Evaluate control technologies for wood-burning appliances; and
- 3) Learn from the experiences of several air pollution control agencies that have implemented wood smoke reduction programs

Forum participants included Dr. Elaine Chang, Dr. Laki Tisopulos, and Larry Kolczak from the AQMD and a panel of industry experts and agency regulators consisting of:

- 1) Mr. Gary Bednorz, Gold Arrow Firewood
- 2) Mr. Paul Tiegs, OMNI Test Laboratories
- 3) Dr. John Crouch, Hearth Patio and Barbeque Association
- 4) Chris Caron, Duraflame, Inc.
- 5) Larry Allen, San Luis Obispo Air Pollution Control District
- 6) Tina Burton, Washoe County Air Quality Management District
- 7) Wayne Clark, San Joaquin Valley Unified Air Pollution Control District

Summary of Expert Panel Presentations

The following is a summary of the presentations from the Expert Panel and AQMD staff. Copies of presentations are available for download at other portions of this web site.

- 1) Dr. Elaine Chang opened the meeting by introducing the Panel members. Dr. Chang provided some background information and explained that, based on public comments, both the 2003 Air Quality Management Plan (AQMP) and 2007 AQMP included control measures to reduce particulate emissions from residential wood burning. She further explained that, based on California Air Resources Board (CARB) comments, the 2007 AQMP control measure was revised to include an expanded discussion of potential control options. Accordingly, the previously proposed regulatory program (Rule 445 -

Wood Smoke Control Technology Forum

Wood Burning Appliances) has been withdrawn to allow AQMD staff additional time to evaluate the various 2007 AQMP wood burning control measure strategies and to allow additional public input.

- 2) Dr. Laki Tisopulos provided an update of current air quality conditions in southern California, with an emphasis on fine particulate matter, or PM_{2.5}. He explained that despite tremendous progress in reducing emissions, the region still exceeds State and federal air quality standards for Ozone and PM_{2.5} and wood burning also emits toxic air contaminants. Dr. Tisopulos summarized the various control strategies included in the 2007 AQMP wood burning control measure and stated that the goal is to develop both a voluntary and regulatory program that is appropriate for this area. He also pointed out that direct PM_{2.5} reductions contribute significantly to overall progress towards attainment.
- 3) Gary Bednorz gave some background information on firewood sales in southern California. Mr. Bednorz explained that the typical unit for measuring firewood is by cord (128 cubic feet of wood) and that wood is typically differentiated between hard woods (i.e., oak) and soft woods (i.e., pine). He indicated that wood dried with a moisture content of 20 percent or less burns cleaner and that outdoor wood burning represents an increasing percentage of their sales. He indicated that his company's sales information is proprietary and that sales are driven largely by weather (the more rain, the higher the sales). Based on conversations with representatives from the Angeles National Forest, Mr. Bednorz indicated that there is very limited public extraction of firewood on public lands (approximately 100 cords per year) in this area.
- 4) Paul Tiegs provided background information on the various types of wood burning appliances (i.e., open hearth fireplace, U.S. EPA Phase II-certified wood heater, masonry heaters, pellet stoves, and gaseous-fueled appliances). He further explained the various U.S. EPA and ASTM test methods for measuring emissions from wood burning appliances. Mr. Tiegs also explained that an ASTM methodology (E251-07) has been developed to measure emissions from open hearth fireplaces based on real world conditions.
- 5) Dr. John Crouch went into more detail on the background and need for an ASTM test method for open hearth fireplaces and that the test method would be an invaluable tool as part of the U.S. EPA's voluntary program to reduce emissions from open hearth fireplaces. He stated that the U.S. EPA has convened a stakeholder group consisting of industry, testing labs and State/local regulators to set an emissions target or passing grade for cleaner burning open hearth fireplaces. Dr. Crouch concluded by stating that the process was similar to the NSPS regulations developed for wood heaters in the late 1980s in that Phase 1 standards would be implemented in the near-term and that more stringent Phase 2 standards would be developed for future implementation.
- 6) Chris Caron supplied background information on the manufactured firelog industry and usage data for southern California (i.e., 50% of households with fireplaces have used firelogs in the last year and 20% use firelogs as the sole fuel source). Mr. Caron also presented results of laboratory testing that evaluated the relative criteria pollutant and air toxic emissions from firelogs versus cordwood. He also noted that his company has switched the product formulation so that petroleum-based waxes have been replaced with

Wood Smoke Control Technology Forum

bio-wax (plant and animal material) resulting in fewer green house gas emissions when compared with gaseous-fueled appliances. Mr. Caron also noted that his company has partnered with other west coast States and local air districts to disseminate information on clean burning alternatives.

- 7) Larry Allen, Air Pollution Control Officer, provided an overview of San Luis Obispo County APCD Rule 504 (Residential Wood Combustion) adopted in 1993. Mr. Allen explained that the rule establishes best technology standards for new construction, prohibits the sale of non-compliant, used wood burning appliances, and requires retailers to provide information on the program at the point of sale. He also explained that the program requires adoption of fireplace building code standards by local governments and that local governments enforce the standards for new construction. Mr. Allen concluded his presentation by indicating that potential program enhancements included increased education and outreach, use of grant funds to provide incentives for the change-out of non-compliant devices, additional local government staff training, and a development of a voluntary curtailment program during periods of poor air quality.
- 8) Tina Burton, Plans/Permits/Applications Aide, described the residential wood smoke reduction program contained in Washoe County APCD Rule 040.051 (Wood Stove/Fireplace Insert Emissions). Ms. Burton indicated that the regulation limits the number of certified wood stoves or fireplaces to no more than one per acre in new construction and that installation of additional solid fuel burning devices is prohibited in existing developments. She noted that these requirements are not applicable to low emitting devices which include: gaseous-fueled appliances, pellet stoves, masonry heaters, and other appliances that meet a certified emission rate of 1 gram/hour or less. Ms. Burton also stated that the regulation contains a “property transfer” provision that requires the removal of uncertified wood stoves at the time of sale of a property. She described that if a property for sale has an existing wood stove an inspection is required to determine if the device is certified. If the device is certified a Notice of Exemption is filed by the property owner and the information is provided to the title company. If the property has an uncertified stove, the device must be removed or replaced with a low emitting device. Ms. Burton also stated that the property transfer requirements do not apply to properties with an open hearth fireplace.
- 9) Wayne Clark, Compliance Manager, described the requirements of San Joaquin Valley Unified APCD Rule 4901 (Wood Burning Fireplaces and Wood Burning Heaters) as originally adopted in 1993 and amended in 2003. The major rule requirements include a limitation on wood burning devices in new developments based on density, property transfer requirements to replace or remove uncertified devices, and voluntary and mandatory wood burning curtailments during periods of poor air quality. A voluntary curtailment is called when the PM10 Air Quality Index (AQI) exceeds 100 and a mandatory curtailment is made when the AQI is forecasted to be greater than 150. Mr. Burton described that the curtailment program exempts residences that are above 3,000 feet, those without natural gas service, and those where wood burning is a sole source of heat. He stated that compliance activities are conducted in response to complaints and limited surveillance. Violators are issued a \$50 fine with the option of attending a wood burning education class. Mr. Burton also said that the District has initiated a voucher program to help residents exchange uncertified wood heaters and that the District has

Wood Smoke Control Technology Forum

conducted an extensive outreach campaign with press releases, billboards, and radio/television public service announcements.

Roundtable Discussion

The following were the major topics of discussion during the Roundtable portion of the meeting.

Firewood Moisture Content

Discussion focused on: (1) moisture content for firewood; (2) the appropriate time for firewood to cure; and, with evidence that drier wood burns cleaner, should efforts be developed to require use of firewood with lower moisture content. Industry representatives stated that wood burning appliances are typically designed to burn wood with a moisture content of no more than 20 percent and that wood that is too dry will vaporize too quickly resulting in greater emissions and may result in creosote build up. There was consensus that a moisture content of 20 percent was optimal and that this level has been specified in other air district regulations. Curing times for firewood will vary with how the wood is stored, diameter of logs, temperature, humidity, etc. Taking these variables into consideration, it was generally agreed that six months was a minimal curing time, additional time may be necessary for hard woods (oak, citrus, etc.) and that splitting of logs to create additional surface area is recommended.

Characteristics of Voluntary and Mandatory Wood Burning Curtailment Programs

A dialog ensued on the merits of voluntary versus mandatory wood burning curtailment programs. Some Panel members were curious if the voluntary wood burning curtailments in the San Joaquin Valley reduced the likelihood of invoking mandatory curtailments. The San Joaquin Valley representative stated that this was a difficult question to answer but that it was his belief that, generally speaking, there has been a reduction in wood burning in the region. Industry representatives stated that survey work can help determine the public attitudes to curtailment programs and noted that Sacramento Metropolitan AQMD and Bay Area AQMD have completed survey work to gauge the public's awareness and acceptance of voluntary and mandatory wood burning curtailment programs.

Public Outreach

There was agreement that a comprehensive outreach and education program is a key component to developing a successful wood smoke reduction program. The San Joaquin Valley representative noted that during the early years of program implementation there was significant media attention and this helps to get the word out to the general public. He also noted that as media interest subsides in subsequent years it is important for the air districts to budget for continued outreach activities.

Incentive Programs

AQMD staff initiated a discussion on implementing incentive programs where the public is encouraged to switch to cleaner hearth technologies through financial incentives. Specific questions were related to the amount of incentive necessary to get the public to act. Industry representatives stated that the issue of incentive pricing is very complex but that programs

Wood Smoke Control Technology Forum

implemented in California typically involve incentives in the \$300 to \$500 range. Industry representatives also stated that funding sources for incentive programs include grants, settlement funds, mitigation fees and contributions from individual hearth product retailers. Industry representatives also stated that air districts have different timeframes for implementing these programs and that the industry would prefer a consistent Statewide approach with an emphasis on implementing the program during the spring when hearth product retailers and installers are less busy. The Washoe County AQMD representative cautioned Panel members about installation costs noting that, in some instances, they can be as much as the cost of the appliance.

Property Transfer Programs

There was discussion on the property transfer programs implemented in various air district regulations that require the removal or replacement of non-certified wood heaters (not open hearth fireplaces) when a property changes ownership. The discussion centered on the feasibility of implementing such programs due to concerns from the real estate community, lenders, and the general public that see the process as an obstacle to completing real estate transactions. The San Joaquin Valley representative noted that under their program, the seller is responsible for completing the form and submitting it to the buyer and the air district and that the program does not involve the escrow process. If complaints arise in the future, the air district can go back to verify that the information submitted was factual. The Washoe County representative it is simply a part of the real estate transaction process. The Panel agreed that education of all parties involved in the real estate sector is a key component to successful program implementation.

Green House Gas Emissions

Based on the information presented in the Panel, there was a discussion on green house gas (GHG) emissions from various hearth products. Industry Panel representatives noted that under the Intergovernmental Panel on Climate Change (IPCC) reporting procedures, carbon dioxide emissions from combustion of renewable resources are typically not reported as contributors to global warming. This is because if the material was not combusted it would decompose naturally, thereby releasing GHG emissions. Agency Panel members noted that all sources of combustion release carbon dioxide emissions and that further research was needed to clarify the relative magnitude of emissions from various hearth products (wood, gaseous-fueled, bio-wax, etc.).

Wood Smoke Control Technology Forum

Outdoor Wood Burning

The Panel recognized an increased use of outdoor wood burning appliances and that sometimes these units are used in warmer months when windows may be open resulting in increased nuisance potential for neighbors. Representatives from air districts stated that use of curtailment provisions and other regulations can help to address emissions from outdoor wood burning appliances but that no agency has directly addressed this issue. They also noted that the use of these appliances is very sporadic and may not be significant contributors to regional air quality degradation. Survey work may help to understand the magnitude of use of these devices. Industry representatives noted that there are less polluting alternatives to traditional backyard firepits, including firelogs and gaseous-fueled devices.

Lessons Learned in San Joaquin Valley

From a compliance standpoint, the representative from the San Joaquin Valley indicated the importance of clarity in the exemptions provided for the mandatory wood burning curtailment program. Individuals may, for example, seek an exemption from the mandatory curtailment provisions when a central heating system is not functional; however, this situation is not clearly defined in the San Joaquin regulation. Additionally, a recommendation was made for including an economic hardship exemption when implementing the mandatory wood burning curtailment program. Eligibility for an economic hardship exemption could be based on definitions used by utilities for reduced rate programs.

Lessons Learned in San Luis Obispo

The San Luis Obispo County APCD representative also stressed the importance of clear definitions. Providing clear definitions will reduce public confusion and the possibility of the public circumventing the program's requirements. As an example, there were questions of applicability of the program to commercial uses (i.e., is a bed and breakfast facility a residential or commercial use?). Education of local government building and code enforcement personnel was also identified as a key component of the program as these individuals are the primary compliance tools. Regular spot checks by air district compliance staff can also help ensure successful program implementation.

Lessons Learned in Washoe County (Reno Nevada Area)

The Washoe County representative stressed that unlike other air pollution programs that involve interaction with businesses and industry, the wood smoke reduction program involves individual homeowners. Accordingly, it was important to provide program flexibility. This flexibility allows the public to believe that they are receiving good service and this belief will aid in achieving public cooperation in attaining the program's goals.

Wood Smoke Control Technology Forum

Public Comments and Questions

The following is a summary of the Public Comment and Question portion of the Forum.

- 1) A hearth product manufacturer was supportive of the work to develop a low emission open hearth fireplace and asked air district Panel members if consideration could be made to allow installation of low emission open hearth fireplaces in their jurisdictions. Air district Panel members thought that the only avenue to allow these low emission open hearth fireplaces was if they achieved the same emissions standards as those identified for wood stoves and inserts. Industry Panel members suggested that the California Air Pollution Control Officers Association (CAPCOA) might be tasked with looking into this issue.
- 2) A representative from the Realtor's Committee on Air Quality stated that based on the presentations made, it appears that there may be an overestimation of the amount of wood burned in southern California and an underestimation of gaseous-fueled fireplaces. The representative also stated that incentive partnership programs should focus on households that use wood burning appliances for heating purposes. The representative further questioned the San Joaquin Valley air district Panel member on the magnitude of PM reductions attributable to the wood smoke control program and the effectiveness of the property transfer requirements in that region.
- 3) A member of the audience made comments on the relative comparison of emissions between gaseous-fueled appliances, firewood and firelogs. He thought that firewood and firelog fires would be active until the fuel was spent whereas gaseous-fueled appliances could be used for shorter timeframes and can be extinguished instantly.

Next Steps

Dr. Laki Tisopulos explained that the next step in development of the wood smoke reduction program was to convene an Ad-Hoc AQMD Board member-directed committee to evaluate the effectiveness, enforceability and applicability of the strategies included in the AQMP wood smoke control measure, as well as strategies adopted by other agencies. Based on this effort, a wood smoke reduction program, that is appropriate for this area, will be developed and implemented. Dr. Tisopulos also stated that the program will focus on public education/outreach as well as incentives.