

Within the next three to five years there may be a profound change in the hearth industry. Succinctly put, nothing less than the very business complexion of nearly all wood-burning hearth industry manufacturers, distributors, retailers and service providers is in the balance. In a very real sense our fate is in the hands of the U.S. Environmental Protection Agency.

That freight train heading down the tracks is called the "New Source Performance Standard" (NSPS). NSPS's are regulations, developed under the Federal Clean Air Act of 1970, that "are issued for categories of air-pollutant sources that cause or contribute significantly to air pollution that may reasonably be anticipated to endanger public health or welfare." Further, "an NSPS requires these sources to control emissions to the level achievable by best demonstrated technology or BDT..."

The U.S. EPA has published NSPS's for over 90 source types since 1971, with the NSPS for "Residential Wood Heaters" being the last one promulgated on Feb. 26, 1988. The NSPS is why wood-fired heaters must be certified to be legally sold in the U.S. today. It is also notable that each NSPS is supposed to be officially reviewed at least once every eight years. So...the residential wood-fired heater NSPS is way overdue for review and the U.S. EPA is now anxious to start the process.

Not only are the rules of engagement likely to change for freestanding wood stoves, fireplace inserts and pellet stoves now regulated by the current NSPS, but other residential solid-fueled devices also may be included in the new NSPS coming down the tracks. These other types of residential heaters might include hydronic heaters, furnaces, masonry heaters, cookstoves, those cordwood and pellet stoves currently exempt from the existing EPA rules, and even fireplaces, coal stoves and corn-burning stoves. It is still unclear how encompassing the new regulations may be. At the time of this writing (beginning of November) the industry is anxiously waiting for EPA to formally make its intentions known.

There is one thing that can be said for certain: If the U.S. EPA is serious about revising the current NSPS, there will be a huge flurry of activity during the next two to five years. Unquestion-

ably, there will be many, many industry meetings hosted by the HPBA for its affected members; there will be many, many internal company meetings to develop business plan adjustments that will be needed in order for companies to cope with all of the expected changes to federal, state, local and even tribal air quality regulations around the country; there will be stakeholder meetings between private and public sector parties; and there will be meetings between the EPA and their contractors charged with compiling stacks of relevant information needed for drafting the proposed rule changes and for managing all of the information that could be needed for potential litigation.

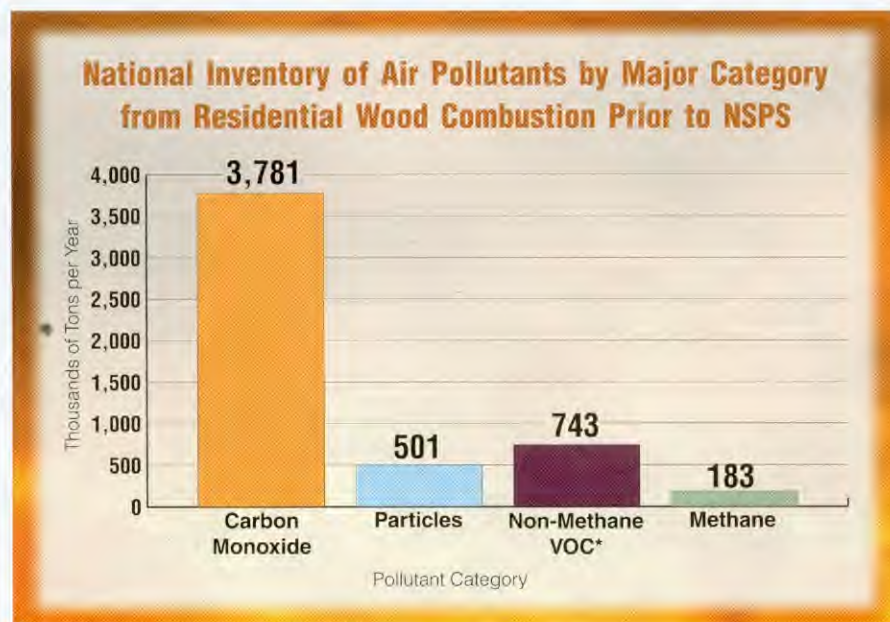
There will also be some pretty heavy-weight and unavoidable political posturing that will take place. On top of all that, there is likely to be a flood of comments filed by environmental and health-related consumer protection watchdog groups.

The process will start out with the "Federal Register" publication announc-

ing EPA's intent to revise the current NSPS for solid fuel-fired heaters. Then there will be opportunities for public comment, press releases and hearth industry-sponsored research projects with white paper publications. The process virtually will be a government jobs creation activity; it will employ a lot of attorneys, scientists, regulators, policy makers, environmentalists, government administrators, planners, engineers, economists, businessmen, health specialists, air quality specialists and politicians; and very importantly – it will cost us all a lot of money, directly from our costs to participate and indirectly from the burden it puts on taxpayers.

Again, it is still unclear where it all might lead. At one end of the spectrum, the new NSPS may be little different than the current NSPS with the *status quo* more or less prevailing or, we suppose, there is at least a very small possibility that the anticipated NSPS review and subsequent revision may be dropped altogether by EPA. On the other end of the spectrum, it may shake our industry to its financial core, creating extreme hardships for some of us but new opportunities for others.

To get some sense of reality we have analyzed some of the more obvious issues, ramifications and history of the current NSPS in the remaining part of this article. We also have explored the current thinking among experts about what a new wood-fired heater NSPS might entail, although it's still early in the process.



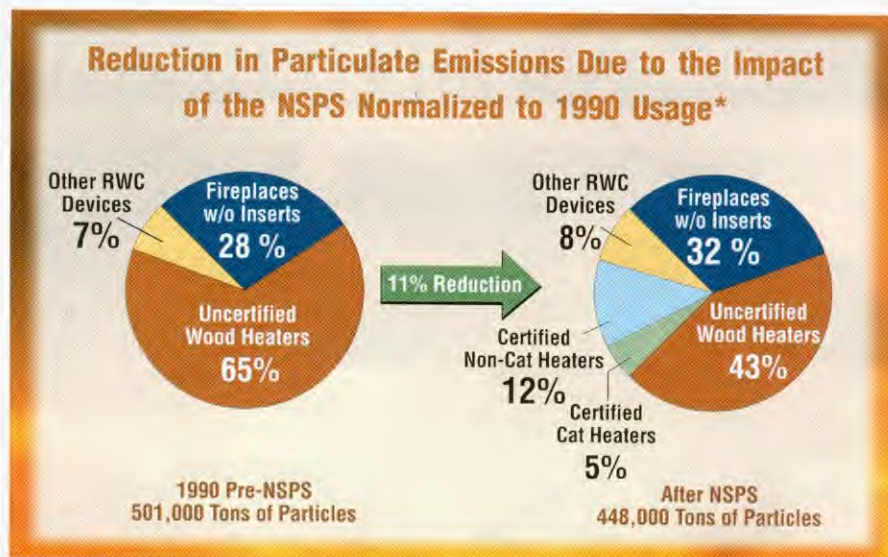
(1990 EPA data). *VOC = volatile organic compounds.

Why would residential heating with solid fuel be a target for environmental regulations?

Let's get straight to the point – there is no way to avoid the fact that residential solid fuel combustion emits air pollutants and by the very nature of wood-fired heaters, their air emissions end up concentrated at near-ground-level in residential areas. It would be irresponsible for regulatory agencies not to take a hard look at home heating, particularly wood-fired home heating as wood dominates among the solid fuel types typically used.

Incomplete solid-fuel combustion produces carbon monoxide (CO), fine particles (actually condensation droplets and solid aerosols also known as respirable particles or PM_{2.5}) and volatile organic compounds (VOC). A number of organic compounds known to be a threat to human health – and imprecisely referred to as air toxics – are contained in the fine particles and are also part of the VOC list.

Unfortunately, unlike thousand-foot high industrial smoke stacks, home-heating emissions are released at elevations from 15 to 35 feet above local area ground levels, which makes it difficult to avoid exposing local residents to the potential nuisance as well as the potentially hazardous pollutants. Further, most homes in North America exchange inside and outside air at least once every several hours, providing a pathway for what's in the air outside to get inside.



**(The estimated reduction assumes the number of households using wood as a fuel remained constant since 1990). RWC = Residential Wood Combustion.*

Has the current NSPS been effective in reducing pollution?

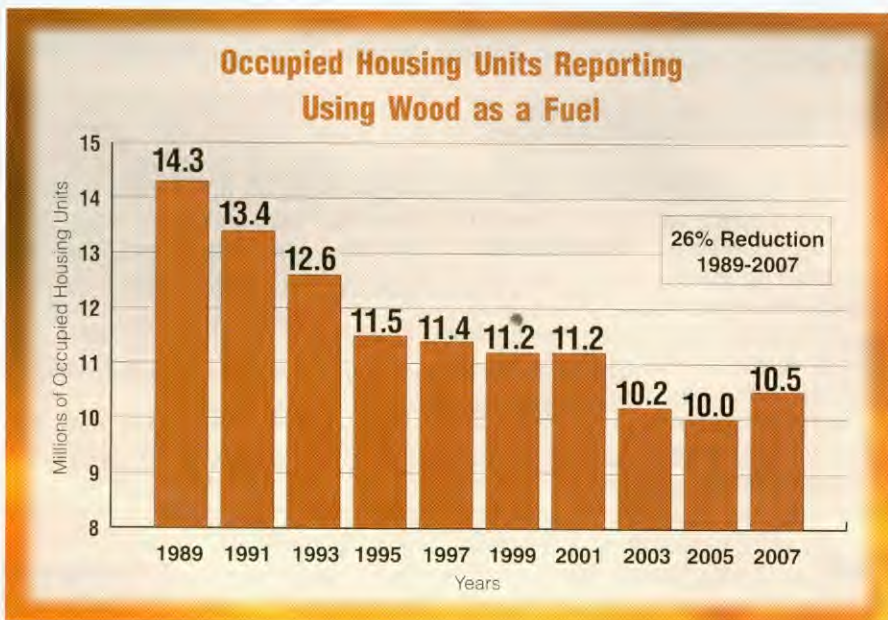
There is no question that wood-fired heaters made to pass the current NSPS and used in consumers' homes produce less air emissions than their pre-NSPS predecessors. The advent of the NSPS absolutely made progress in the protection of human health and the environment. As an example, according to a widely accepted U.S. EPA document (EPA-450/4-82-003), the particulate emission factor for certified (Phase 2) non-catalytic, wood-fired stoves averages 14.6 lb particles/ton dry fuel burned

as compared to the 30.6 lb/ton produced by old, pre-NSPS, uncertified models.

Similarly, the corresponding emission factor for carbon monoxide is reported to average 140.8 lb CO/ton dry fuel for new EPA-certified (Phase 2) non-catalytic, wood-fired stoves as compared to 230.8 lb/ton dry fuel for the old uncertified models. These reductions are 52 and 29 percent, respectively, which is not bad. Further, even without any significant data from their real-world in-home use, it is conventional wisdom that, on average, the newest of the EPA-certified, wood-fired stoves are significantly better in reducing air emissions than earlier certified models. It also should be remembered that new certified, wood-fired heaters are in the range of 10 to 30 percent more efficient than their older uncertified brethren, meaning that air emissions are reduced, if all else is equal, simply because less wood is burned.

There are some problems with the current NSPS, however. First, the current NSPS does not require old uncertified wood heaters to be replaced; it simply requires that only EPA-certified wood heaters can be sold and installed in the U.S. Consequently, it is estimated that about 70 percent of the wood heaters in use today are still the old uncertified models.

Second, only freestanding cordwood stoves, cordwood fireplace inserts and pellet stoves and inserts are regulated by the current NSPS. Fireplaces, wood-fired furnaces, hydronic heaters, masonry



(AHS data).

heaters, exempt wood heaters, wood-fired cookstoves, corn-burning stoves and coal-burning stoves are not included. In aggregate these units not covered by the current NSPS produce slightly more than a third of the total air emissions from residential solid-fuel burning.

Third, wood-fired heaters are not the pyramids of Giza. They last a long time but not millennia and their air emissions become greater with age. Of course, the longevity of anything from automobile tires to blue jeans depends on how hard they are used, but based on interviews with those with wood-fired heater testing experience, a reasonable estimate of the "typical" lifetime of a wood-fired heater before significant deterioration occurs is 12 years. Door gaskets and catalysts usually show the effects of aging much sooner. As with air emissions, it is conventional wisdom that the good-operating lifetime of wood-fired heaters and their components has improved from the earlier EPA-certified models, but also, as with real-world air emissions for the newest of models, there is little supporting data.

Normalizing emission reductions to account for the decline in the number of homes reporting using wood as a fuel since 1990, i.e., looking at the effect of the NSPS alone and ignoring the fact that fewer homes are now using wood, the reduction in particulate emissions from residential solid fuel combustion solely due to the NSPS regulations since 1990 is about 11 percent.

At what cost?

At what cost was the 11 percent reduction achieved? Fiscally it was a serious challenge for many in the hearth industry. It was particularly hard on small manufacturers. According to a 1986 study by the American Enterprise Institute (AEI) and Brookings Institution Joint Center for Regulatory Studies conducted for the EPA, there were 200 to 300 wood heater manufacturers prior to the current NSPS. Approximately one-third of these produced fewer than 1,000 heaters per year. The cost to develop, test and tool-up for the production of new low-emitting wood-fired heater models is generally several hundreds of thousands of dollars each.

Ed. Note: While memories do fail as the years pass, we feel the AEI-Brookings estimate of the number of wood stove manufacturers prior to the current NSPS is low. Our estimate, and

that of other manufacturers with whom we have spoken, is that there were at least 500 and perhaps many more.

"Those who cannot remember the past are condemned to repeat it."

— George Santayana

According to EPA's official list of certified wood-fired stoves www.epa.gov/oecaerth/resources/publications/monitoring/caa/woodstoves/certifiedwood.pdf, the approximate total number of manufacturers that have ever certified a wood-fired heater since 1988 is 120. This supports a common anecdotal observation that suggests there are far fewer wood-fired heater manufacturers now,

particularly small manufacturers, even when accounting for new players that have more recently entered the market, than there were prior to the current NSPS. Most point to the increased costs associated with bringing new certifiable heaters to market as being responsible.

The retail prices of wood-fired heaters have indeed increased but clearly not enough to offset the development costs for new models. Again, reviewing the 1986 AEI-Brookings study, the costs of non-catalytic and catalytic heaters (adjusted to 2007 dollars) prior to the NSPS were \$1,189 and \$1,505, respectively. For comparison, a 2007 *Hearth & Home* survey showed the median best-selling retail price for wood-fired stoves and wood-fired inserts as \$1,500 and \$1,800. Consumers are paying more but not a lot more, suggesting hearth industry profit margins may be less than they were before the current NSPS.

NSPS – SOME FACTS

Designation: Standards of Performance for New Stationary Sources; New Residential Wood Heaters, Vol. 53, No. 38, pp. 5860-5922, February 26, 1988, Federal Register.

Length of Final Rule: Approximately 60,000 words. (For comparison the U.S. Constitution is 4,440 words and a typical mystery novel is between 60,000 and 80,000 words).

Number of wood heaters certified under program as of May 22, 2009: 836 models.

Total approximate cost to manufacturers to develop, bring to production, and certify 836 new models: Estimated at more than \$400 million.

Number of wood heater manufacturers prior to NSPS: 200 to 300; 1/3 produced fewer than 1,000 heaters per year; 1/3 produced 1,000 to 5,000 heaters per year; 1/3 produced more than 50,000 heaters per year.

The two-thirds of manufacturers making less than 5,000 heaters per year held only 15 percent of the market share at the time of the NSPS promulgation.

Total number of wood heater manufacturers that have ever certified a wood heater as of May 22, 2009: 120 (note this is an approximate number due to mergers, acquisition of product lines, and subsidiary status of some companies).

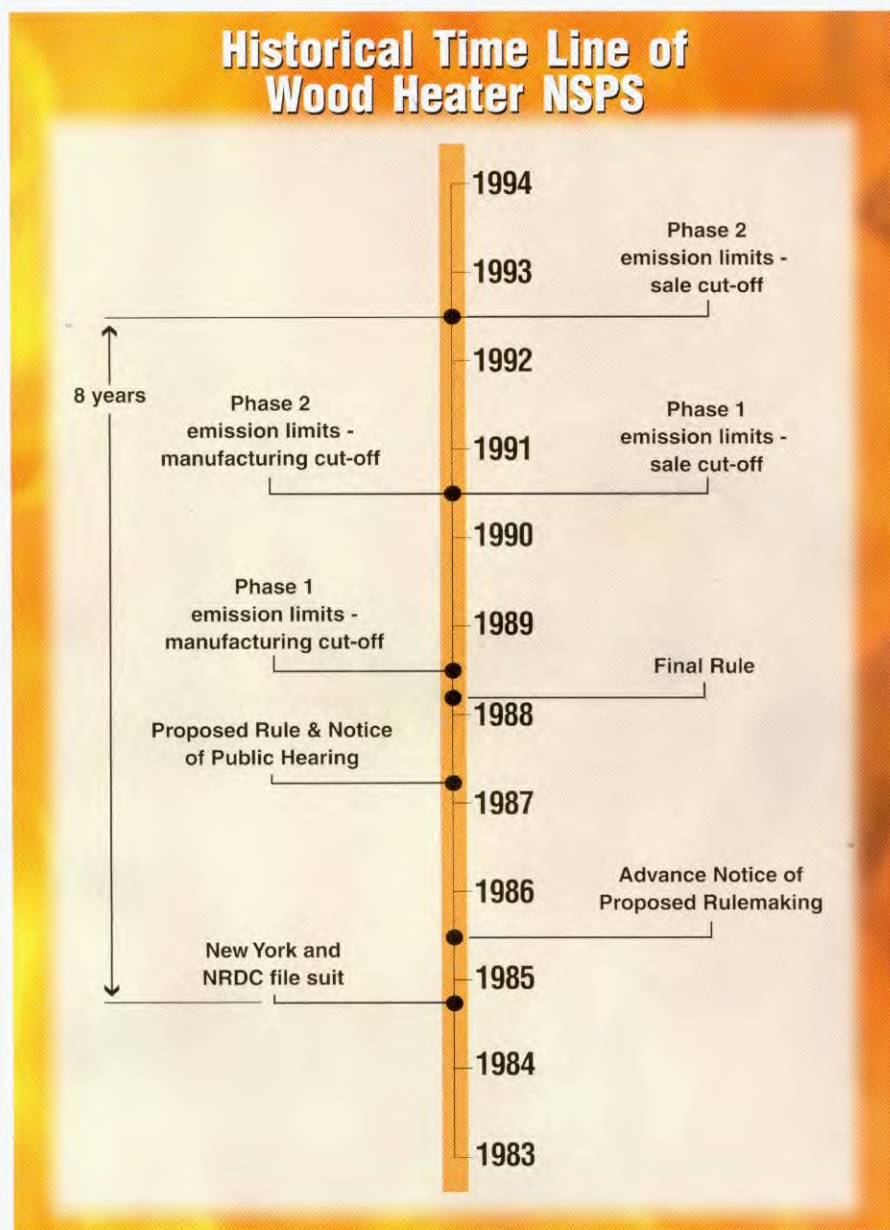
Reported average pre-NSPS retail price of catalytic and non-catalytic heaters: \$901 and \$712 (1986 dollars), respectively. Price adjusted to 2007 dollars, \$1,505 and \$1,189.

Median 2007 best-selling retail price, wood stove: \$1,500 and wood insert: \$1,800.

Reduction in the number of households reporting using wood as a space heating fuel since start of NSPS: 26%.

What have we learned?

- We have learned that technology can reduce air emissions from solid-fuel burning heaters.
- We have learned that NSPS regulations have to be stricter and more encompassing to make a big difference in solid-fuel heater impacts to ambient air.
- We have learned that NSPS regulations have the potential for dire economic consequences on the hearth industry and especially on small manufacturers.
- We have learned that strong advocacy for favorable industry positions can backfire if the bar is set too low and credibility is lost.
- We have learned that unless a regulation is technology-forcing yet still reasonable no one wins.
- We have learned that not only did science and engineering play a role in the decisions for the current NSPS but expediency did as well, not with generally good outcomes.
- We have learned that there is room for a lot of improvement in the testing protocols supporting the standards.
- We have learned that consumers will have to pay more and the hearth industry's profits will decrease with more stringent regulations.
- We have learned that air emissions from residential solid-fuel-fired heaters do pose a real potential threat to public health and the environment.
- We have learned that regulatory timelines invariably take longer than planned, particularly if litigation is involved.
- And finally, we have learned that there is a real opportunity for industry representatives and the regulators to work together to come up with reasonable compromises for the tough issues faced by the industry.



The bottom line that should not be forgotten is that the climate of the United States, excluding Hawaii and the southernmost tip of Florida, can best be described as ranging from temperate to arctic – space heating is needed in almost every home and all space-heating options, including solid fuel combustion, have environmental pros and cons.

Where do we go from here?

It is early in the NSPS development game and still unclear what biomass-fired (and/or coal-fired) appliances EPA will decide to regulate and how stringent the EPA intends to be, i.e., what the details are of what EPA wants to do. However, prudence would dictate

staying informed and getting involved if for nothing more than to protect one's own self-interests. Simply put and without embellishment – substantial changes in products and business practices may become necessary; it is not too early to begin preparations.

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