

distinguish between residential-type units and industrial, commercial or institutional units. Therefore, the proposed rule regulates industrial, commercial, and institutional boilers and process heaters located at major source facilities but excludes residential-type hot water heaters.

The Clean Air Act allows EPA to divide source categories into subcategories when differences between given types of units lead to corresponding differences in the nature of emissions and the technical feasibility of applying emission control techniques. The design, operating, and emissions information that EPA has reviewed indicates the need to subcategorize boilers and process heaters based on the physical state of the fuel burned, *i.e.*, solid, liquid, or gas. Data indicate that there are significant design and operational differences between units that burn solid, liquid and gaseous fuels.

Boiler systems are designed for specific fuel types and will encounter problems if a fuel with characteristics other than those originally specified is fired. While many boilers in the population database are indicated to co-fire liquids or gases with solid fuels, in actuality most of these commonly use fuel oil or natural gas as a startup fuel only. Other co-fired units are specifically designed to fire combinations of solids, liquids, and gases. Changes to the fuel type (solid, liquid, or gas) would require extensive changes to the fuel handling and feeding system (*e.g.*, a stoker using wood as fuel would need to be redesigned to handle fuel oil or gaseous fuel). Additionally, the burners and combustion chamber would need to be redesigned and modified to handle different fuel types and account for increases or decreases in the fuel volume and shape. In some cases, the changes may reduce the capacity and efficiency of the boiler or process heater. An additional effect of these changes would be extensive retrofit costs.

Emissions from boilers and process heaters burning solids, liquids, and gaseous fuels will also differ. Boilers and process heaters emit a number of different types of HAP emissions. In general, their formation is dependent upon the composition of the fuel. The combustion quality and temperature may also play an important role. The fuel dependent HAP emissions from boilers and process heaters are metals, including mercury, and acid gases. These fuel dependent HAP emissions generally can be controlled by either changing the fuel property before combustion or by removing the HAP

from the flue gas after combustion. Organic HAP, on the other hand, are formed from incomplete combustion and are much less influenced by the characteristics of the fuel being burned. The degree of combustion may be greatly influenced by three general factors: time, turbulence, and temperature. These factors are a function of the design of the boiler or process heater which is dependent in part on the type of fuel being burned.

Solid fuel-fired units will emit larger amounts of PM and metals depending on the solid fuel burned. Liquid and gaseous fuel-fired units generally emit larger amounts of organic HAP. Because these different types of units have different emission characteristics which may influence the feasibility of effectiveness of emission control, they should be regulated separately (*i.e.*, subcategorized). Thus, these categories appropriately identify distinctly different types of units subject to regulation.

Accordingly, EPA decided to subcategorize boilers and process heaters into solid, liquid and gaseous fuel subcategories in order to account for these differences in emissions and applicable controls. The solid fuel subcategory includes boilers and process heaters burning any amount of solid fuel (including units burning a combination of solid fuel and liquid or gaseous fuel). The gaseous fuel subcategory includes units only burning gaseous fuel. The liquid fuel subcategory includes all remaining boilers and process heaters.

Small boilers and process heaters were also identified as a subcategory. These small units typically are package units having capacities less than 10 MMBtu/hr heat input or use a combustor design (*i.e.*, firetube or cast iron) which is not common in large units. Large boilers generally are field-erected using the watertube combustor design with capacities above 10 MMBtu/hr. As discussed above, the design of the boiler or process heater will influence the completeness of the combustion process which will influence the formation of organic HAP emissions. The vast majority of these small units use natural gas as fuel. Additionally, most existing State and Federal regulations for boilers and process heaters do not regulate units with a heat input capacity of less than 10 MMBtu/hr, due to their low emissions. Consequently, we decided to further subcategorize boilers and process heaters within each fuel category by creating subcategories for large units (watertube boilers and process heaters greater than 10 MMBtu/hr

capacity) and small units (all firetube boilers and boilers and process heaters of any other type with less than or equal to 10 MMBtu/hr capacity).

A review of the information gathered on boilers also shows that a number of units operate as backup, emergency, or peaking units that operate infrequently. Back-up or emergency units only operate if another boiler that is the regular source of energy or steam is not operating (for example due to a shutdown for maintenance and repair). Peaking units operate only during peak energy use periods, typically in the summer months. The boiler database indicates that these infrequently operated units typically operate 10 percent of the year or less. These limited use boilers, when called upon to operate, must respond without failure and without lengthy periods of startup. While these are potential sources of emissions, and it is appropriate for EPA to address them in the proposal, the Agency believes that their use and operation are different compared to typical industrial, commercial, and institutional boilers. Consequently, we decided that such limited use units should have their own subcategory. Therefore, the proposed rule has subcategories for boilers and process heaters having a capacity utilization of less than 10 percent.

In summary, we have identified nine subcategories of boilers and process heaters located at major sources: (1) Large solid fuel-fired boilers and process heaters (sizes greater than 10 MMBtu/hr), (2) large liquid fuel-fired boilers and process heaters (sizes greater than 10 MMBtu/hr), (3) large gaseous fuel-fired boilers and process heaters (sizes greater than 10 MMBtu/hr), (4) small solid fuel-fired boilers and process heaters (firetubes or any unit less than or equal to 10 MMBtu/hr), (5) small liquid fuel-fired boilers and process heaters (sizes less than or equal to 10 MMBtu/hr), (6) small gaseous fuel-fired boilers and process heaters (sizes less than or equal to 10 MMBtu/hr), (7) limited use solid fuel-fired boilers and process heaters (large units with capacity utilization less than or equal to 10 percent), (8) limited use liquid fuel-fired boilers and process heaters (large units with capacity utilization less than or equal to 10 percent), and (9) limited use gaseous fuel-fired boilers and process heaters (large units with capacity utilization less than or equal to 10 percent).

#### *B. How Did EPA Select the Format for the Proposed Rule?*

The proposed rule includes emission limits for PM, selected metallic HAP,